THE
AMERICAN ANTHROPOLOGIST.

VOL. III. WASHINGTON, D. C., APRIL, 1890. No. 2.

THE CHEROKEE BALL PLAY.

BY JAMES MOONEY.

The Indian game of the ball play is common to all the tribes from Maine to California, and from the sunlit waters of the Gulf of Mexico to the frozen shores of Hudson bay. When or where the Indian first obtained the game it is not our province to inquire, but we may safely assume that the brown-skinned savage shaped the pliant hickory staff with his knife and flint and twisted the net of bear sinew ages before visions of a western world began to float through the brain of the Italian dreamer.

In its general features, Indian ball play was the same all over the country, with this important exception, that among the northern and western tribes the player used but one ball stick, while in the Gulf States each contestant carried two and caught the ball between them. In California men and women played together, while among most of the more warlike tribes to the eastward it was pre-eminently a manly game, and it was believed to insure defeat to a party if a woman even so much as touched a ball stick.

The game has a history, even though that history be fragmentary, like all that goes to make up the sum of our knowledge of the aboriginal race. The French, whose light-hearted gaiety and ready adaptability so endeared them to the hearts of their wild allies, were quick to take up the Indian ball game as a relief from the dreary monotony of long weeks in the garrison or lonely days in the forest. It became a favorite pastime, and still survives among the creoles of Louisiana under the name of *Raquette*, while in the more invigorating atmosphere of the north it assumed a new life, and, with the cruder features eliminated, became the famous Canadian national game of *La Crosse*. It was by means of a cleverly devised

stratagem of a ball play that the savage warriors of Pontiac were enabled to surprise and capture the English garrison of old Fort Mackinaw in 1763. Two years before the Ojibwa chief had sent the ominous message: "Englishmen, although you have conquered the French, you have not yet conquered us;" but the warning was unheeded. The vengeance of the savage may sleep, but never dies. On the fourth of June, 1763, the birthday of King George of England, the warriors of two great tribes assembled in front of the fort, ostensibly to play a game in honor of the occasion and to decide the tribal championship. The commandant himself came out to encourage his favorites and bet on the result, while the soldiers leaned against the palisades and the squaws sat about in groups, all intently watching every movement of the play. Suddenly there comes a crisis in the game. One athletic young fellow with a powerful stroke sends the ball high in air, and as it descends in a graceful curve it rolls along the ground to the gate of the fort, followed by four hundred yelling savages. But look! As they run each painted warrior snatches from his squaw the hatchet which she had concealed under her blanket, and the next moment it is buried in the brain of the nearest soldier. The English, taken completely by surprise, are cut down without resistance. In a few minutes all is over, and a solitary trader, looking out from the garret where he had been hidden by a friendly squaw, sees the ground covered with the bodies of his slaughtered countrymen, while with yells of savage victory their butchers are drinking the blood scooped up in the hollow of their joined hands.

Let us turn from this dark picture to more recent times. In the late war three hundred of the East Cherokee entered the Confederate service, and in the summer of 1863—just a century after the fatal day of Mackinaw—a detachment of them was left to guard the bridge over the Holston river, at Strawberry Plains, in Tennessee. But an Indian never takes kindly to anything in the nature of garrison duty, and time hung heavy on their hands. At last, in a moment of inspiration, one man proposed that they make some ball sticks and have a game. The suggestion was received with hearty favor, and soon all hands were at work putting up the poles, shaping the hickory sticks, and twisting the bark for the netting. The preliminary ceremonies were dispensed with for once, the players stripped, and the game began, while the rest of the Indians looked on with eager interest. Whether Wolf Town or the Big Cove would have

won that game will never be known, for in the middle of it an advanced detachment of the "Yankees" slipped in, burned the bridge, and were moving forward, when the Cherokee, losing all interest in the game, broke for cover and left the Federals in possession of the ground.

In 1834, before the removal of the Cherokee to the west, a great game was played near the present site of Jasper, Georgia, between the settlements of Hickory Log and Coosawattee, in which there were eighteen players on a side, and the chiefs of the rival settlements wagered $1,000 apiece on the result.

There is a tradition among the few old traders still living in upper Georgia, to the effect that a large tract in this part of the state was won by the Cherokee from the Creeks in a ball play. There are no Cherokee now living in Georgia to substantiate the story, but I am inclined to put some faith in it from the fact that Coosawattee, although the name of a Cherokee settlement, signifies "the old country of the Creeks." The numerous localities in the Southern States bearing the name of "Ball Flat," "Ball Ground," and "Ball Play" bear witness to the fondness of the Indian for the play. To the red warrior it was indeed a royal game, worthy to be played on the king's day, with the empire of the northwest for the stake.

As speed and suppleness of limb and a considerable degree of muscular strength are prime requisites in the game, the players are always selected from among the most athletic young men, and to be known as an expert player was a distinction hardly less coveted than fame as a warrior. To bring the game to its highest perfection, the best players voluntarily subjected themselves to a regular course of training and conjuring; so that in time they came to be regarded as professionals who might be counted on to take part in every contest, exactly like the professional ball player among the whites. To farther incite them to strain every nerve for victory, two settlements, or sometimes two rival tribes, were always pitted against each other, and guns, blankets, horses—everything the Indian had or valued—were staked upon the result. The prayers and ceremonies of the shamans, the speeches of the old men, and the songs of the dancers were all alike calculated to stimulate to the highest pitch the courage and endurance of the contestants.

It is a matter of surprise that so little has been said of this game by travelers and other observers of Indian life. Powers, in his

great work upon the California tribes, dismisses it in a brief paragraph; the notices in Schoolcraft's six bulky volumes altogether make hardly two pages, while even the artist Catlin, who spent years with the wild tribes, has but little to say of the game itself, although his spirited ball pictures go far to make amends for the deficiency. All these writers, however, appear to have confined their attention almost entirely to the play alone, noticing the ball-play dance only briefly, if at all, and seeming to be completely unaware of the secret ceremonies and incantations—the fasting, bathing, and other mystic rites—which for days and weeks precede the play and attend every step of the game; so that it may be said without exaggeration that a full exposition of the Indian ball play would furnish material for a fair sized volume. During several field seasons spent with the East Cherokee in North Carolina, the author devoted much attention to the study of the mythology and ceremonial of this game, which will now be described as it exists to-day among these Indians. For illustration, the last game witnessed on the reservation, in September, 1889, will be selected.

According to a Cherokee myth, the animals once challenged the birds to a great ball play. The wager was accepted, the preliminaries were arranged, and at last the contestants assembled at the appointed spot—the animals on the ground, while the birds took position in the tree-tops to await the throwing up of the ball. On the side of the animals were the bear, whose ponderous weight bore down all opposition; the deer, who excelled all others in running; and the terrapin, who was invulnerable to the stoutest blows. On the side of the birds were the eagle, the hawk, and the great *Tlâniwă*—all noted for their swiftness and power of flight. While the latter were pruning their feathers and watching every motion of their adversaries below they noticed two small creatures, hardly larger than mice, climbing up the tree on which was perched the leader of the birds. Finally they reached the top and humbly asked the captain to be allowed to join in the game. The captain looked at them a moment and, seeing that they were four-footed, asked them why they did not go to the animals where they properly belonged. The little things explained that they had done so, but had been laughed at and rejected on account of their diminutive size. On hearing their story the bird captain was disposed to take pity on them, but there was one serious difficulty in the way—how could they join the birds when they had no wings? The eagle, the

hawk, and the rest now crowded around, and after some discussion it was decided to try and make wings for the little fellows. But how to do it! All at once, by a happy inspiration, one bethought himself of the drum which was to be used in the dance. The head was made of ground-hog leather, and perhaps a corner could be cut off and utilized for wings. No sooner suggested than done. Two pieces of leather taken from the drum-head were cut into shape and attached to the legs of one of the small animals, and thus originated *Tlameha*, the bat. The ball was now tossed up, and the bat was told to catch it, and his expertness in dodging and circling about, keeping the ball constantly in motion and never allowing it to fall to the ground, soon convinced the birds that they had gained a most valuable ally.

They next turned their attention to the other little creature, and now behold a worse difficulty! All their leather had been used in making the wings for the bat, and there was no time to send for more. In this dilemma it was suggested that perhaps wings might be made by stretching out the skin of the animal itself. So two large birds seized him from opposite sides with their strong bills, and by tugging and pulling at his fur for several minutes succeeded in stretching the skin between the fore and hind feet until at last the thing was done and there was *Tewa*, the flying squirrel. Then the bird captain, to try him, threw up the ball, when the flying squirrel, with a graceful bound, sprang off the limb and, catching it in his teeth, carried it through the air to another tree-top a hundred feet away.

When all was ready the game began, but at the very outset the flying squirrel caught the ball and carried it up a tree, then threw it to the birds, who kept it in the air for some time, when it dropped; but just before it reached the ground the bat seized it, and by his dodging and doubling kept it out of the way of even the swiftest of the animals until he finally threw it in at the goal, and thus won the victory for the birds. Because of their assistance on this occasion, the ball player invokes the aid of the bat and the flying squirrel and ties a small piece of the bat's wing to his ball stick or fastens it to the frame on which the sticks are hung during the dance.

The game, which of course has different names among the various tribes, is called *anetsâ* by the Cherokee. The ball season begins about the middle of summer and lasts until the weather

is too cold to permit exposure of the naked body, for the players are always stripped for the game. The favorite time is in the fall, after the corn has ripened, for then the Indian has abundant leisure, and at this season a game takes place somewhere on the reservation at least every other week, while several parties are always in training. The training consists chiefly of regular athletic practice, the players of one side coming together with their ball sticks at some convenient spot of level bottom land, where they strip to the waist, divide into parties, and run, tumble, and toss the ball until the sun goes down. The Indian boys take to this sport as naturally as our youngsters take to playing soldier, and frequently in my evening walks I have come upon a group of little fellows from eight to twelve years old, all stripped like professionals, running, yelling, and tumbling over each other in their scramble for the ball, while their ball sticks clattered together at a great rate—altogether as noisy and happy a crowd of children as can be found anywhere in the world.

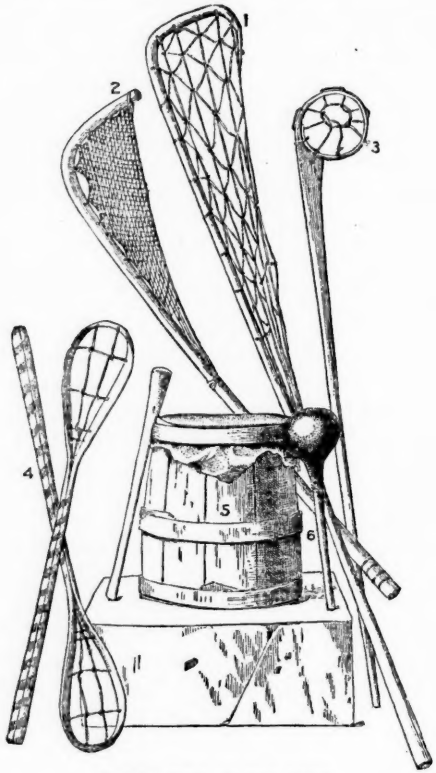
In addition to the athletic training, which begins two or three weeks before the regular game, each player is put under a strict *gaktûnta*, or tabu, during the same period. He must not eat the flesh of a rabbit (of which the Indians generally are very fond) because the rabbit is a timid animal, easily alarmed and liable to lose its wits when pursued by the hunter. Hence the ball player must abstain from it, lest he too should become disconcerted and lose courage in the game. He must also avoid the meat of the frog (another item on the Indian bill of fare) because the frog's bones are brittle and easily broken, and a player who should partake of the animal would expect to be crippled in the first inning. For a similar reason he abstains from eating the young of any bird or animal, and from touching an infant. He must not eat the fish called the hog-sucker, because it is sluggish in its movements. He must not eat the herb called *atûnka* or Lamb's Quarter (*Chenopodium album*), which the Indians use for greens, because its stalk is easily broken. Hot food and salt are also forbidden, as in the medical gaktûnta. The tabu always lasts for seven days preceding the game, but in most cases is enforced for twenty-eight days—*i. e.*, 4 x 7—four and seven being sacred numbers. Above all, he must not touch a woman, and the player who should violate this regulation would expose himself to the summary vengeance of his fellows. This last tabu continues also for seven days after the game. As before stated, if a

woman even so much as touches a ball stick on the eve of a game it is thereby rendered unfit for use. As the white man's law is now paramount, extreme measures are seldom resorted to, but in former days the punishment for an infraction of this regulation was severe, and in some tribes the penalty was death. Should a player's wife be with child, he is not allowed to take part in the game under any circumstances, as he is then believed to be heavy and sluggish in his movements, having lost just so much of his strength as has gone to the child. At frequent intervals during the training period the shaman takes the players to water and performs his mystic rites, as will be explained further on. They are also "scratched" on their naked bodies, as at the final game, but now the scratching is done in a haphazard fashion with a piece of bamboo brier having stout thorns which leave broad gashes on the backs of the victims.

When a player fears a particular contestant on the other side, as is frequently the case, his own shaman performs a special incantation, intended to compass the defeat and even the disabling or death of his rival. As the contending sides always belong to different settlements, each party makes all these preliminary arrangements without the knowledge of the other, and under the guidance of its own shamans, several of whom are employed on a side in every hotly contested game. Thus the ball play becomes as well a contest between rival shamans. Among primitive peoples the shaman is in truth all-powerful, and even so simple a matter as the ball game is not left to the free enjoyment of the people, but is so interwoven with priestly rites and influence that the shaman becomes the most important actor in the play.

Before introducing the ball dance it is in place here to describe the principal implements of the game, the ball and ball stick. The ball now used is an ordinary leather-covered ball, but in former days it was made of deer hair and covered with deer skin. In California the ball is of wood. The ball sticks vary considerably among different tribes. As before stated, the Cherokee player uses a pair, catching the ball between them and throwing it in the same way. The stick is something less than three feet in length and in its general appearance closely resembles a tennis racket, or a long wooden spoon, the bowl of which is a loose network of thongs of twisted squirrel skin or strings of Indian hemp. The frame is made of a slender hickory stick, bent upon itself and so trimmed and fashioned that the handle seems to be one solid round piece, when in fact it

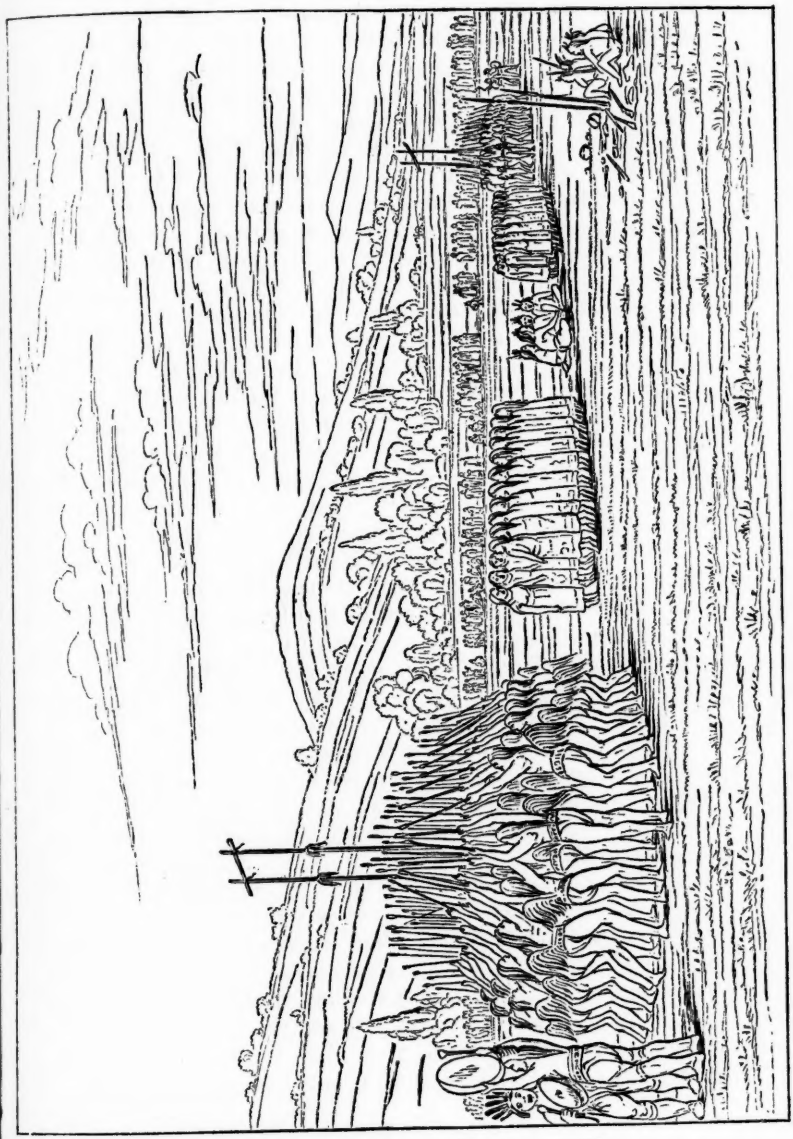
is double. The other southern tribes generally used sticks of the same pattern. Among the Sioux and Ojibwa of the north the player uses a single stick bent around at the end so as to form a hoop, in which a loose netting is fixed. The ball is caught up in this hoop and held there in running by waving the stick from side to side in



INSTRUMENTS OF THE GAME.

1 Iroquois.	3 Ojibwa.	5 Drum.
2 Passamaquoddy.	4 Cherokee.	6 Rattle.

a peculiarly dextrous manner. In the St. Lawrence region and Canada, the home of *La Crosse*, the stick is about four and a half feet long, and is bent over at the end like a shepherd's crook, with



15 CHOCTAW BALL-PLAY DANCE IN 1832—FROM CATLIN.

the netting extending half way down its length. The Passamaquoddy Indians of Maine use a stick with a strong, closely woven netting, which enables the stick to be used for batting. The sticks are ornamented with designs cut or burnt into the wood, and are sometimes further adorned with paint and feathers.

On the night preceding the game each party holds the ball-play dance in its own settlement. On the reservation the dance is always held on Friday night, so that the game may take place on Saturday afternoon, in order to give the players and spectators an opportunity to sleep off the effects on Sunday. It may be remarked here in parenthesis that the Cherokee word for Sunday signifies "when everybody does nothing all day long," showing that they fully appreciate its superior advantages as a day of rest. The dance must be held close to the river, to enable the players to "go to water" during the night, but the exact spot selected is always a matter of uncertainty, up to the last moment, excepting with a chosen few. If this were not the case a spy from the other settlement might endeavor to insure the defeat of the party by strewing along their trail a soup made of the hamstrings of rabbits, which would have the effect of rendering the players timorous and easily confused.

The dance begins soon after dark on the night preceding the game and lasts until daybreak, and from the time they eat supper before the dance until after the game, on the following afternoon, no food passes the lips of the players. On the occasion in question the young men of Yellow Hill were to contend against those of Raven Town, about ten miles further up the river, and as the latter place was a large settlement, noted for its adherence to the old traditions, a spirited game was expected. My headquarters were at Yellow Hill, and as the principal shaman of that party was my chief informant and lived in the same house with me, he kept me well posted in regard to all the preparations. Through his influence I was enabled to get a number of good photographic views pertaining to the game, as well as to observe all the shamanistic ceremonies, which he himself explained, together with the secret prayers recited during their performance. On a former occasion I attempted to take views of the game, but was prevented by the shamans, on the ground that such a proceeding would destroy the efficacy of their incantations.

Each party holds a dance in its own settlement, the game itself taking place about midway between. The Yellow Hill men were to have their dance up the river, about half a mile from my house.

We started about 9 o'clock in the evening—for there was no need to hurry—and before long began to meet groups of dark figures by twos and threes going in the same direction or sitting by the roadside awaiting some lagging companions. It was too dark to distinguish faces, but familiar voices revealed the identity of the speakers, and among them were a number who had come from distances of six or eight miles. As we drew nearer, the measured beat of the Indian drum fell upon the ear, and soon we saw the figures of the dancers outlined against the firelight, while the soft voices of the women as they sang the chorus of the ball songs mingled their plaintive cadences with the shouts of the men.

The spot selected for the dance was a narrow strip of gravelly bottom, where the mountain came close down to the water's edge. The tract was only a few acres in extent and was covered with large trees, their tops bound together by a network of wild grape-vines which hung down on all sides in graceful festoons. From the road the ground sloped abruptly down to this bottom, while almost overhead the mountain was dimly outlined through the night fog, and close at hand one of the rapids, so frequent in these mountain streams, disturbed the stillness of the night with its never-ceasing roar.

Several fires were burning and in the fitful blaze the trees sent out long shadows to melt into the surrounding darkness, while just within the circle of light, leaning against the trees or stretched out upon the ground, were the Indians, the women with their motionless figures muffled up in white sheets seeming like ghosts returned to earth, and the babies, whose mothers were in the dance, laid away under the bushes to sleep, with only a shawl between them and the cold ground. Around the larger fire were the dancers, the men stripped as for the game, with their ball-sticks in their hands and the firelight playing upon their naked bodies. It was a weird, wild picture, not easily effaced from the memory.

The ball-play dance is participated in by both sexes, but differs considerably from any other of the dances of the tribe, being a dual affair throughout. The dancers are the players of the morrow, with seven women, representing the seven Cherokee clans. The men dance in a circle around the fire, chanting responses to the sound of a rattle carried by another performer, who circles around on the outside, while the women stand in line a few feet away and dance to and fro, now advancing a few steps toward the men, then wheeling and dancing away from them, but all the while

keeping time to the sound of the drum and chanting the refrain to the ball songs sung by the drummer, who is seated on the ground on the side farthest from the fire. The rattle is a gourd fitted with a handle and filled with small pebbles, while the drum resembles a small keg with a head of ground-hog leather. The drum is partly filled with water, the head being also moistened to improve the tone, and is beaten with a single stick. Men and women dance separately throughout, the music, the evolutions, and the songs being entirely distinct, but all combining to produce an harmonious whole. The women are relieved at intervals by others who take their places, but the men dance in the same narrow circle the whole night long, excepting during the frequent halts for the purpose of going to water.

At one side of the fire are set up two forked poles, supporting a third laid horizontally, upon which the ball sticks are crossed in pairs until the dance begins. As already mentioned, small pieces from the wing of the bat are sometimes tied to these poles, and also to the rattle used in the dance, to insure success in the contest. The skins of several bats and swift-darting insectivorous birds were formerly wrapped up in a piece of deerskin, together with the cloth and beads used in the conjuring ceremonies later on, and hung from the frame during the dance. On finally dressing for the game at the ball ground the players took the feathers from these skins to fasten in their hair or upon their ball sticks to insure swiftness and accuracy in their movements. Sometimes also hairs from the whiskers of the bat are twisted into the netting of the ball sticks. The players are all stripped and painted, with feathers in their hair, just as they appear in the game. When all is ready an attendant takes down the ball sticks from the frame, throwing them over his arm in the same fashion, and, walking around the circle, gives to each man his own. Then the rattler, taking his instrument in his hand, begins to trot around on the outside of the circle, uttering a sharp *Hī!* to which the players respond with a quick *Hi-hī'!* while slowly moving around the circle with their ball sticks held tightly in front of their breasts. Then, with a quicker movement, the song changes to *Ehu'!* and the response to *Hăhī'!—Ehu'! Hăhī'! Ehu'! Hăhī'!* Then, with a prolonged shake of the rattle, it changes again to *Ahiyé'!* the dancers responding with the same word *Ahiyé'!* but in a higher key; the movements become more lively and the chorus louder, till at a given signal with the rattle the players clap their

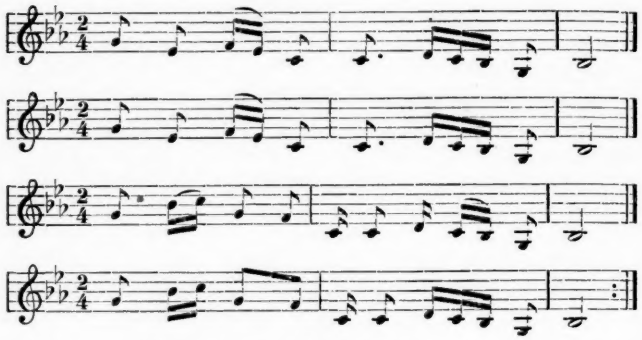
ball sticks together, and facing around, go through the motions of picking up and tossing an imaginary ball. Finally with a grand rush they dance up close to the women, and the first part of the performance ends with a loud prolonged *Hu-ŭ!* from the whole crowd.

In the meantime the women have taken position in a line a few feet away, with their backs turned to the men, while in front of them the drummer is seated on the ground, but with his back turned toward them and the rest of the dancers. After a few preliminary taps on the drum he begins a slow, measured beat and strikes up one of the dance refrains, which the women take up in chorus. This is repeated a number of times until all are in harmony with the tune, when he begins to improvise, choosing words which will harmonize with the measure of the chorus and at the same time be appropriate to the subject of the dance. As this requires a ready wit in addition to ability as a singer, the selection of a drummer is a matter of considerable importance, and that functionary is held in corresponding estimation. He sings of the game on the morrow, of the fine things to be won by the men of his party, of the joy with which they will be received by their friends on their return from the field, and of the disappointment and defeat of their rivals. Throughout it all the women keep up the same minor refrain, like an instrumental accompaniment to vocal music. As Cherokee songs are always in the minor key, they have a plaintive effect, even when the sentiment is cheerful or even boisterous, and are calculated to excite the mirth of one who understands the language. This impression is heightened by the appearance of the dancers themselves, for the women shuffle solemnly back and forth all night long without ever a smile upon their faces, while the occasional laughter of the men seems half subdued, with none of the hearty ringing tones of the white man or the negro. The monotonous repetition, too, is something intolerable to any one but an Indian, the same words, to the same tune, being sometimes sung over and over again for a half hour or more. Although the singer improvises as he proceeds, many of the expressions have now become stereotyped and are used at almost every ball-play dance. The song here given is a good type of the class.

Through the kind assistance of Prof. John P. Sousa, director of the Marine band, I am enabled to give also the musical notation.

The words have no fixed order of arrangement and the song may be repeated indefinitely. *Higanuyahi* is the refrain sung by the

women and has no meaning. The vowels have the Latin sound and *û* is the French nasal *un:*

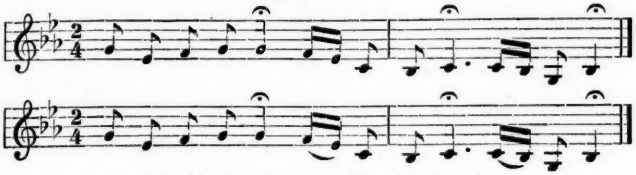
FIRST SONG.

Hi'ganu'ya, hi'ganu'yahi'
Hi'ganu'ya hi'ganu'yahi'

Sâ'kwīli-te'ga tsī'tûkata'sûni'!
As'taliti'ski tsī'tûkata'sûni'!
As'taliti'ski tsa'kwakilû'testi!
U'watu'hi tsī'tûkata'sûni'!
Ti'kanane'hi a'kwakilû'tati'!
Uwa'tutsû'hi tsī'tûkata'sûni'!
Uwa'tutsû'hi tsa'kwakilû'testi'!
I'geski'yu tsa'kwakilû'testi'!
Ti'kanane'hi tsī'tûkata'sûni'!—Hu-ū!

Which may be freely rendered:

What a fine horse I shall win!
I shall win a pacer!
I shall be riding a pacer!
I'm going to win a pretty one!
A stallion for me to ride!
What a pretty one I shall win!
What a pretty one I shall ride!
How proud I'll feel when riding him!
I'm going to win a stallion!—Hu-ū!

But *sic transit gloria!*—in these degenerate days the pacer is more likely to be represented by a cheap jack-knife. Another very pretty refrain is:

SECOND SONG.

Yo′wida′nuwe′ Yo′widanu′-da′nuwe′.

At a certain stage of the dance a man, specially selected for the purpose, leaves the group of spectators around the fire and retires a short distance into the darkness in the direction of the rival settlement. Then, standing with his face still turned in the same direction, he raises his hand to his mouth and utters four yells, the last prolonged into a peculiar quaver. He is answered by the players with a chorus of yells—or rather yelps, for the Indian yell resembles nothing else so much as the bark of a puppy. Then he comes running back until he passes the circle of dancers, when he halts and shouts out a single word, which may be translated, "They are already beaten!" Another chorus of yells greets this announcement. This man is called the *Talala*, or "woodpecker," on account of his peculiar yell, which is considered to resemble the sound made by a woodpecker tapping on a dead tree trunk. According to the orthodox Cherokee belief, this yell is heard by the rival players in the other settlement—who, it will be remembered, are having a ball dance of their own at the same time—and so terrifies them that they lose all heart for the game. The fact that both sides alike have a *Talala* in no way interferes with the theory.

At frequent intervals during the night all the players, accompanied by the shaman and his assistant, leave the dance and go down to a retired spot at the river's bank, where they perform the mystic rite known as "going to water," hereafter to be described. While the players are performing this ceremony the women, with the drummer, continue the dance and chorus. The dance is kept up without intermission, and almost without change, until daybreak. At the final dance green pine tops are thrown upon the fire, so as to produce a thick smoke, which envelops the dancers. Some

mystic properties are ascribed to this pine smoke, but what they are I have not yet learned, although the ceremony seems to be intended as an exorcism, the same thing being done at other dances when there has recently been a death in the settlement.

At sunrise the players, dressed now in their ordinary clothes, but carrying their ball sticks in their hands, start for the ball ground, accompanied by the shamans and their assistants. The place selected for the game, being always about midway between the two rival settlements, was in this case several miles above the dance ground and on the opposite side of the river. On the march each party makes four several halts, when each player again "goes to water" separately with the shaman. This occupies considerable time, so that it is usually after noon before the two parties meet on the ball ground. While the shaman is busy with his mysteries in the laurel bushes down by the water's edge, the other players, sitting by the side of the trail, spend the time twisting extra strings for their ball sticks, adjusting their feather ornaments and discussing the coming game. In former times the player during these halts was not allowed to sit upon a log, a stone, or anything but the ground itself; neither was it permissible to lean against anything excepting the back of another player, on penalty of defeat in the game, with the additional risk of being bitten by a rattlesnake. This rule is now disregarded, and it is doubtful if any but the older men are aware that it ever existed.

On coming up from the water after the fourth halt the principal shaman assembles the players around him and delivers an animated harangue, exhorting them to do their utmost in the coming contest, telling them that they will undoubtedly be victorious as the omens are all favorable, picturing to their delighted vision the stakes to be won and the ovation awaiting them from their friends after the game, and finally assuring them in the mystic terms of the formulas that their adversaries will be driven through the four gaps into the gloomy shadows of the Darkening Land, where they will perish forever from remembrance. The address, delivered in rapid, jerky tones like the speech of an auctioneer, has a very inspiriting effect upon the hearers and is frequently interrupted by a burst of exultant yells from the players. At the end, with another chorus of yells, they again take up the march.

On arriving in sight of the ball ground the *Talala* again comes to the front and announces their approach with four loud yells,

ending with a long quaver, as on the previous night at the dance. The players respond with another yell, and then turn off to a convenient sheltered place by the river to make the final preparations.

The shaman then marks off a small space upon the ground to represent the ball field, and, taking in his hand a small bundle of sharpened stakes about a foot in length, addresses each man in turn, telling him the position which he is to occupy in the field at the tossing up of the ball after the first inning, and driving down a stake to represent each player until he has a diagram of the whole field spread out upon the ground.

The players then strip for the ordeal of scratching. This painful operation is performed by an assistant, in this case by an old man named Standing Water. The instrument of torture is called a *kanuga* and resembles a short comb with seven teeth, seven being also a sacred number with the Cherokees. The teeth are made of sharpened splinters from the leg bone of a turkey and are fixed in a frame made from the shaft of a turkey quill, in such a manner that by a slight pressure of the thumb they can be pushed out to the length of a small tack. Why the bone and feather of the turkey should be selected I have not yet learned, but there is undoubtedly an Indian reason for the choice.

The players having stripped, the operator begins by seizing the arm of a player with one hand while holding the *kanuga* in the other, and plunges the teeth into the flesh at the shoulder, bringing the instrument down with a steady pressure to the elbow, leaving seven white lines which become red a moment later, as the blood starts to the surface. He now plunges the *kanuga* in again at another place near the shoulder, and again brings it down to the elbow. Again and again the operation is repeated until the victim's arm is scratched in twenty-eight lines above the elbow. It will be noticed that twenty-eight is a combination of four and seven, the two sacred numbers of the Cherokees. The operator then makes the same number of scratches in the same manner on the arm below the elbow. Next the other arm is treated in the same way; then each leg, both above and below the knee, and finally an **X** is scratched across the breast of the sufferer, the upper ends are joined by another stroke from shoulder to shoulder, and a similar pattern is scratched upon his back. By this time the blood is trickling in little streams from nearly three hundred gashes. None of the scratches are deep, but they are unquestionably very painful, as all

agree who have undergone the operation. Nevertheless the young men endure the ordeal willingly and almost cheerfully, regarding it as a necessary part of the ritual to secure success in the game. In order to secure a picture of one young fellow under the operation I stood with my camera so near that I could distinctly hear the teeth tear through the flesh at every scratch with a rasping sound that sent a shudder through me, yet he never flinched, although several times he shivered with cold, as the chill autumn wind blew upon his naked body. This scratching is common in Cherokee medical practice, and is variously performed with a brier, a rattlesnake's tooth, a flint, or even a piece of broken glass. It was noted by Adair as early as 1775. To cause the blood to flow more freely the young men sometimes scrape it off with chips as it oozes out. The shaman then gives to each player a small piece of root, to which he has imparted magic properties by the recital of certain secret formulas. Various roots are used, according to the whim of the shaman, their virtue depending entirely upon the ceremony of consecration. The men chew these roots and spit out the juice over their limbs and bodies, rubbing it well into the scratches, then going down to the water plunge in and wash off the blood, after which they come out and dress themselves for the game.

The modern Cherokee ball costume consists simply of a pair of short trunks ornamented with various patterns in red or blue cloth, and a feather charm worn upon the head. Formerly the breechcloth alone was worn, as is still the case in some instances, and the strings with which it was tied were purposely made weak, so that if seized by an opponent in the scuffle the strings would break, leaving the owner to escape with the loss of his sole article of raiment. This calls to mind a similar custom among the ancient Greek athletes, the recollection of which has been preserved in the etymology of the word *gymnast*. The ornament worn in the hair is made up of an eagle's feathers, to give keenness of sight; a deer tail, to give swiftness; and a snake's rattle, to render the wearer terrible to his adversaries. If an eagle's feathers cannot be procured, those of a hawk or any other swift bird of prey are used. In running, the snake rattle is made to furnish a very good imitation of the sound made by the rattlesnake when about to strike. The player also marks his body in various patterns with paint or charcoal. The charcoal is taken from the dance fire, and whenever possible is procured by burning the wood of a tree which has been struck by

CHOCTAW BALL PLAYER IN 1832—FROM CATLIN.

lightning, such wood being regarded as peculiarly sacred and endowed with mysterious properties. According to one formula, the player makes a cross over his heart and a spot upon each shoulder, using pulverized charcoal procured from the shaman and made by burning together the wood of a honey-locust tree and of a tree which has been struck by lightning, *but not killed.* The charcoal is pulverized and put, together with a red and a black bead, into an empty cocoon from which one end has been cut off. This paint preparation makes the player swift like the lightning and invulnerable as the tree that defies the thunderbolt, and renders his flesh as hard and firm to the touch as the wood of the honey-locust. Among the Choctaws, according to Catlin, a tail of horse hair was also worn, so as to stream out behind as the player ran. Just before dressing, the players rub their bodies with grease or the chewed bark of the slippery elm or the sassafras, until their skin is slippery as that of the proverbial eel.

A number of precautionary measures are also frequently resorted to by the more prudent players while training in order to make assurance doubly sure. They bathe their limbs with a decoction of the *Tephrosia Virginiana* or Catgut in order to render their muscles tough like the roots of that plant. They bathe themselves with a decoction of the small rush (*Juncus tenuis*) which grows by the roadside, because its stalks are always erect and will not lie flat upon the ground, however much they may be stamped and trodden upon. In the same way they bathe with a decoction of the wild crabapple or the ironwood, because the trunks of these trees, even when thrown down, are supported and kept up from the ground by their spreading tops. To make themselves more supple they whip themselves with the tough stalks of the *Wā'takû* or Stargrass or with switches made from the bark of a hickory sapling which has grown up from under a log that has fallen across it, the bark being taken from the bend thus produced in the sapling. After the first scratching the player renders himself an object of terror to his opponents by eating a portion of a rattlesnake which has been killed and cooked by the shaman. He rubs himself with an eel skin to make himself slippery like the eel, and rubs each limb down once with the fore and hind leg of a turtle because the legs of that animal are remarkably stout. He applies to the shaman to conjure a dangerous opponent, so that he may be unable to see the ball in its flight, or may dislocate a wrist or break a leg. Sometimes the shaman draws upon the ground

an armless figure of his rival, with a hole where his heart should be. Into this hole he drops two black beads, covers them with earth and stamps upon them, and thus the dreaded rival is doomed, unless (and this is always the saving clause) his own shaman has taken precautions against such a result, or the one in whose behalf the charm is made has rendered the incantation unavailing by a violation of some one of the interminable rules of the gaktunta.

The players having dressed are now ready to "go to water" for the last time, for which purpose the shaman selects a bend of the river where he can look toward the east while facing up-stream. This ceremony of going to water is the most sacred and impressive in the whole Cherokee ritual, and must always be performed fasting, and in most cases also is preceded by an all-night vigil. It is used in connection with prayers to obtain a long life, to destroy an enemy, to win the love of a woman, to secure success in the hunt and the ball play, and for recovery from a dangerous illness, but is performed only as a final resort or when the occasion is one of special importance. The general ceremonial and the principal formulas are nearly the same in all cases. I have collected a number of the formulas used on these various occasions, but it is impossible within the limits of this paper to give more than a general idea of their nature.

The men stand side by side looking down upon the water, with their ball sticks clasped upon their breasts, while the shaman stands just behind them, and an assistant kneeling at his side spreads out upon the ground the cloth upon which are placed the sacred beads. These beads are of two colors, red and black, each kind resting upon a cloth of the same color, and corresponding in number to the number of players. The red beads represent the players for whom the shaman performs the ceremony, while the black beads stand for their opponents, red being symbolic of power and triumph, while black is emblematic of death and misfortune. All being ready, the assistant hands to the shaman a red bead, which he takes between the thumb and finger of his right hand; and then a black bead, which he takes in the same manner in his left hand. Then, holding his hands outstretched, with his eyes intently fixed upon the beads, the shaman prays on behalf of his client to *Yûwĭ Gûnahi'ta*, the "Long Man," the sacred name for the river:

"O Long Man, I come to the edge of your body. You are mighty and most powerful. You bear up great logs and toss them

about where the foam is white. Nothing can resist you. Grant me such strength in the contest that my enemy may be of no weight in my hands—that I may be able to toss him into the air or dash him to the earth." In a similar strain he prays to the Red Bat in the Sun Land to make him expert in dodging; to the Red Deer to make him fleet of foot; to the great Red Hawk to render him keen of sight, and to the Red Rattlesnake to render him terrible to all who oppose him.

Then in the same low tone and broken accents in which all the formulas are recited the shaman declares that his client (mentioning his name and clan) has now ascended to the first heaven. As he continues praying he declares that he has now reached the second heaven (and here he slightly raises his hands); soon he ascends to the third heaven, and the hands of the shaman are raised still higher; then in the same way he ascends to the fourth, the fifth, and the sixth heaven, and finally, as he raises his trembling hands aloft, he declares that the spirit of the man has now risen to the seventh heaven, where his feet are resting upon the Red Seats, from which they shall never be displaced.

Turning now to his client the shaman, in a low voice, asks him the name of his most dreaded rival on the opposite side. The reply is given in a whisper, and the shaman, holding his hands outstretched as before, calls down the most withering curses upon the head of the doomed victim, mentioning him likewise by name and clan. He prays to the Black Fog to cover him so that he may be unable to see his way; to the Black Rattlesnake to envelop him in its slimy folds; and at last to the Black Spider to let down his black thread from above, wrap it about the soul of the victim and drag it from his body along the black trail to the Darkening Land in the west, there to bury it in the black coffin under the black clay, never to reappear. At the final imprecation he stoops and, making a hole in the soft earth with his finger (symbolic of stabbing the doomed man to the heart), drops the black bead into it and covers it from sight with a vicious stamp of his foot; then with a simultaneous movement each man dips his ball sticks into the water, and bringing them up, touches them to his lips; then stooping again he dips up the water in his hand and laves his head and breast.

Below is given a translation of one of these formulas, from the collection of original Cherokee manuscripts obtained by the writer. The formulistic name for the player signifies "admirer

or lover of the ball play." The shaman directs his attention alternately to his clients and their opponents, looking by turns at the red or the black bead as he prays. He raises his friends to the seventh heaven and invokes in their behalf the aid of the bat and a number of birds, which, according to the Cherokee belief, are so keen of sight and so swift upon the wing as never to fail to seize their intended prey. The opposing players, on the other hand, are put under the earth and rendered like the terrapin, the turtle, the mole, and the bear—all slow and clumsy of movement. Blue is the color symbolic of defeat, red is typical of success, and white signifies joy and happiness. The exultant whoop or shout of the players is believed to bear them on to victory, as trees are carried along by the resistless force of a torrent:

"THIS IS TO TAKE THEM TO WATER FOR THE BALL PLAY."

"Sgĕ! Now, where the white thread has been let down, quickly we are about to inquire into the fate of the lovers of the ball play.

They are of *such a* descent. They are called *so and so.* (As they march) they are shaking the road which shall never be joyful. The miserable terrapin has fastened himself upon them as they go about. They are doomed to failure. They have become entirely blue.

But now my lovers of the ball play have their roads lying down in this direction. The Red Bat has come and become one with them. There, in the first heaven, are the pleasing stakes. There, in the second heaven, are the pleasing stakes. The Peewee has come and joined them. Their ball sticks shall be borne along by the immortal whoop, never to fail them in the contest.

But as for the lovers of the ball play on the other side, the common turtle has fastened himself to them as they go about. There, under the earth, they are doomed to failure.

There, in the third heaven, are the pleasing stakes. The Red Tla′niwă has come and made himself one of them, never to be defeated. There, in the fourth heaven, are the pleasing stakes. The Crested Flycatcher has come and joined them, that they may never be defeated. There, in the fifth heaven, are the pleasing stakes. The Martin has come and joined them, that they may never be defeated.

The other lovers of the ball play—the Blue Mole has become one with them, that they may never feel triumphant. They are doomed to failure.

There, in the sixth heaven, the Chimney Swift has become one with them, that they may never be defeated. There are the pleasing stakes. There, in the seventh heaven, the Dragonfly has become one of them, that they may never be defeated. There are the pleasing stakes.

As for the other lovers of the ball play, the Bear has come and fastened himself to them, that they may never be triumphant. He has caused the stakes to slip out of their hands and their share has dwindled to nothing. Their fate is forecast.

Sgĕ! Now let me know that the twelve (runs) are mine, O White Dragonfly. Let me know that their share is mine—that the stakes are mine. Now he [the rival player] is compelled to let go his hold upon the stakes. They [the shaman's clients] are become exultant and gratified. Yû!"

This ceremony ended, the players form in line, headed by the shaman, and march in single file to the ball ground, where they find awaiting them a crowd of spectators—men, women and children—sometimes to the number of several hundred, for the Indians always turn out to the ball play, no matter how great the distance, from old Big Witch, stooping under the weight of nearly a hundred years, down to babies slung at their mothers' backs. The ball ground is a level field by the river side, surrounded by the high timber-covered mountains. At either end are the goals, each consisting of a pair of upright poles, between which the ball must be driven to make a run, the side which first makes twelve home runs being declared the winner of the game and the stakes. The ball is furnished by the challengers, who sometimes try to select one so small that it will fall through the netting of the ball sticks of their adversaries; but as the others are on the lookout for this, the trick usually fails of its purpose. After the ball is once set in motion it must be picked up only with the ball sticks, although after having picked up the ball with the sticks the player frequently takes it in his hand and, throwing away the sticks, runs with it until intercepted by one of the other party, when he throws it, if he can, to one of his friends further on. Should a player pick up the ball with his hand, as sometimes happens in the scramble, there at once arises all over the field a chorus of *Uwâ'yĭ Gûtĭ! Uwâ'yi Gûtĭ!* "With the hand! With the hand!"—equivalent to our own "Foul! Foul!" and that inning is declared a draw.

While our men are awaiting the arrival of the other party their friends crowd around them, and the women throw across their outstretched ball sticks the pieces of calico, the small squares of sheeting used as shawls, and the bright red handkerchiefs so dear to the heart of the Cherokee, which they intend to stake upon the game. It may be as well to state that these handkerchiefs take the place of hats, bonnets, and scarfs, the women throwing them over their heads in shawl fashion and the men twisting them like turbans about their hair, while both sexes alike fasten them about their throats or use them as bags for carrying small packages. Knives, trinkets, and sometimes small coins are also wagered. But these Cherokee to-day are poor indeed. Hardly a man among them owns a horse, and never again will a chief bet a thousand dollars upon his favorites, as was done in Georgia in 1834. To-day, however, as then, they will risk all they have.

Now a series of yells announces the near approach of the men from Raven Town, and in a few minutes they come filing out from the bushes—stripped, scratched, and decorated like the others, carrying their ball sticks in their hands and headed by a shaman. The two parties come together in the center of the ground, and for a short time the scene resembles an auction, as men and women move about, holding up the articles they propose to wager on the game and bidding for stakes to be matched against them. The betting being ended, the opposing players draw up in two lines facing each other, each man with his ball sticks laid together upon the ground in front of him, with the heads pointing toward the man facing him. This is for the purpose of matching the players so as to get the same number on each side; and should it be found that a player has no antagonist to face him, he must drop out of the game. Such a result frequently happens, as both parties strive to keep their arrangements secret up to the last moment. There is no fixed number on a side, the common quota being from nine to twelve. Catlin, indeed, speaking of the Choctaws, says that "it is no uncommon occurrence for six or eight hundred or a thousand of these young men to engage in a game of ball, with five or six times that number of spectators;" but this was just after the removal, while the entire nation was yet camped upon the prairie in the Indian Territory. It would have been utterly impossible for the shamans to prepare a thousand players, or even one-fourth of that number, in the regular way, and in Catlin's spirited description of the game the ceremonial

part is chiefly conspicuous by its absence. The greatest number that I ever heard of among the old Cherokee was twenty-two on a side. There is another secret formula to be recited by the initiated at this juncture, and addressed to the "Red Yahulu" or hickory, for the purpose of destroying the efficiency of his enemy's ball sticks.

During the whole time that the game is in progress the shaman, concealed in the bushes by the water side, is busy with his prayers and incantations for the success of his clients and the defeat of their rivals. Through his assistant, who acts as messenger, he is kept advised of the movements of the players by seven men, known as counselors, appointed to watch the game for that purpose. These seven counselors also have a general oversight of the conjuring and other proceedings at the ball-play dance. Every little incident is regarded as an omen, and the shaman governs himself accordingly.

An old man now advances with the ball, and standing at one end of the lines, delivers a final address to the players, telling them that *Une'ʻlanû'hĭ*, "the Apportioner"—the sun—is looking down upon them, urging them to acquit themselve in the game as their fathers have done before them; but above all to keep their tempers, so that none may have it to say that they got angry or quarreled, and that after it is over each one may return in peace along the white trail to rest in his white house. White in these formulas is symbolic of peace and happiness and all good things. He concludes with a loud "*Ha! Taldu-gwŭ'*!" "Now for the twelve!" and throws the ball into the air.

Instantly twenty pairs of ball sticks clatter together in the air, as their owners spring to catch the ball in its descent. In the scramble it usually happens that the ball falls to the ground, when it is picked up by one more active than the rest. Frequently, however, a man will succeed in catching it between his ball sticks as it falls, and, disengaging himself from the rest, starts to run with it to the goal; but before he has gone a dozen yards they are upon him, and the whole crowd goes down together, rolling and tumbling over each other in the dust, straining and tugging for possession of the ball, until one of the players manages to extricate himself from the struggling heap and starts off with the ball. At once the others spring to their feet and, throwing away their ball sticks, rush to intercept him or to prevent his capture, their black hair streaming out behind and their naked bodies glistening in the sun as they run. The scene is constantly changing. Now the players are all together

at the lower end of the field, when suddenly, with a powerful throw, a player sends the ball high over the heads of the spectators and into the bushes beyond. Before there is time to realize it, here they come with a grand sweep and a burst of short, sharp Cherokee exclamations, charging right into the crowd, knocking men and women to right and left and stumbling over dogs and babies in their frantic efforts to get at the ball.

It is a very exciting game as well as a very rough one, and in its general features is a combination of base ball, football, and the old-fashioned shinny. Almost everything short of murder is allowable in the game, and both parties sometimes go into the contest with the deliberate purpose of crippling or otherwise disabling the best players on the opposing side. Serious accidents are common. In the last game which I witnessed one man was seized around the waist by a powerfully built adversary, raised up in the air and hurled down upon the ground with such force as to break his collar-bone. His friends pulled him out to one side and the game went on. Sometimes two men lie struggling on the ground, clutching at each other's throats, long after the ball has been carried to the other end of the field, until the "drivers," armed with long, stout switches, come running up and belabor both over their bare shoulders until they are forced to break their hold. It is also the duty of these drivers to gather the ball sticks thrown away in the excitement and restore them to their owners at the beginning of the next inning.

When the ball has been carried through the goal, the players come back to the center and take position in accordance with the previous instructions of their shamans. The two captains stand facing each other and the ball is then thrown up by the captain of the side which won the last inning. Then the struggle begins again, and so the game goes on until one party scores twelve runs and is declared the victor and the winner of the stakes.

As soon as the game is over, usually about sundown, the winning players immediately go to water again with their shamans and perform another ceremony for the purpose of turning aside the revengeful incantations of their defeated rivals. They then dress, and the crowd of hungry players, who have eaten nothing since they started for the dance the night before, make a combined attack on the provisions which the women now produce from their shawls and baskets. It should be mentioned that, to assuage thirst during the game, the players are allowed to drink a sour preparation made from green grapes and wild crabapples.

Although the contestants on both sides are picked men and strive to win, straining every muscle to the utmost, the impression left upon my mind after witnessing a number of games is that the same number of athletic young white men would have infused more robust energy into the play—that is, provided they could stand upon their feet after all the preliminary fasting, bleeding, and loss of sleep. Before separating, the defeated party usually challenges the victors to a second contest, and in a few days preparations are actively under way for another game.

THE POWHATAN INDIANS.—As a preliminary step toward an investigation of the ethnology of the tribes formerly inhabiting the coast region of Virginia and Maryland, the writer last spring sent out a number of circular letters of inquiry, calling for information in regard to the number and condition of any persons of pure or mixed Indian blood still remaining within the region designated. The result shows that there is not now a native full-blood Indian, speaking his own language, from Delaware Bay to Pamlico Sound. The only Indians still recognized as such, living within this area, are two small bands, remnants of the once powerful Powhatans, residing on small reservations in King William county, northeast of Richmond. They have long since lost their language and now have probably as much negro blood as Indian, but still pride themselves upon their descent from the warriors of Powhatan, and have recently applied for a share in the school privileges afforded by the Government Indian school at Hampton. The larger band, on Pamunkey river, numbers about 120 souls, known as Pamunkeys. The others live a few miles distant, on Mattapony river, and number about fifty under the name of Mattaponies. Both bands are governed by chiefs and councilors, with a board of white trustees chosen by the Indians. The following extract from a letter written by William Bradly, the chief of the Pamunkeys, gives an interesting statement of their present condition. Errors of spelling and grammar have been corrected: "It is an Indian reservation in King William county, Virginia, by the name of Indian Town, with about 120 souls. They subsist chiefly by hunting and fishing for a living. They do not vote or pay taxes. We have a chief, councilmen, and trustees, and make and enforce our own laws. I am chief of the tribe, W. A. Bradly. There is a small reservation on Mattapony river. J. M. Allmond is chief." JAMES MOONEY.

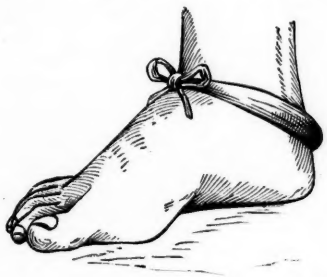
REMARKS ON OJIBWA BALL PLAY.

BY W. J. HOFFMAN, M. D.

Thus far the greater number of Ojibwa Indians of northern Minnesota have been slow to adopt the pursuits of their more civilized neighbors, preferring to spend their time in fishing and hunting and in gathering fruits and berries. In consequence of this mode of life the young men generally possess great endurance and are in excellent physical condition.

During the spring, summer, and autumn much of their time is spent in athletic sports, not so much for pleasure as for the desire to win the wagers of their opponents. The usual sports consist of horse racing, running, and ball play. To become a good ball player one must necessarily be possessed of speed and endurance.

Some of the local Indian runners have adopted an ingenious contrivance to aid in strengthening the muscles of the legs. While at their ordinary avocations, they wear about the ankles a thin bag of shot, sufficiently long to reach around the leg and admit of being tied over the instep. This is removed when occasion requires, and



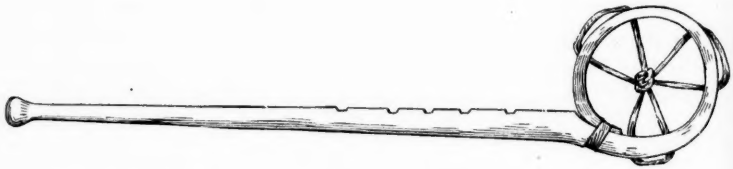
they claim that they feel very "light-footed." Two years ago one of the champion Ojibwa runners walked twenty-three miles after dinner, and next morning ran one hundred yards in ten and one-quarter seconds, easily beating his professional opponents.

The total number of Indians living in the vicinity of White Earth agency, Minnesota, is about two thousand, and it is easy to muster

from eighty to one hundred ball players, who are divided into sides of equal number. If the condition of the ground permits, the two posts or goals are planted about one-third of a mile apart. Thus one stake only is used as a goal instead of two, as is the rule with the southern tribes. The best players of either side gather at the center of the ground. The poorer players arrange themselves around their respective goals, while the heaviest in weight scatter across the field between the starting point and the goals.

The ball is tossed into the air in the center of the field. As soon as it descends it is caught with the ball stick by one of the players, when he immediately sets out at full speed towards the opposite goal. If too closely pursued, or if intercepted by an opponent, he throws the ball in the direction of one of his own side, who takes up the race.

The usual method of depriving a player of the ball is to strike the handle of the ball stick so as to dislodge the ball; but this is frequently a difficult matter on account of a peculiar horizontal motion of the ball stick maintained by the runner. Frequently the



ball carrier is disabled by being struck across the arm or leg, thus compelling his retirement. Severe injuries occur only when playing for high stakes or when ill-feeling exists between some of the players.

Should the ball carrier of one side reach the opposite goal, it is necessary for him to throw the ball so that it touches the post. This is always a difficult matter, because, even if the ball be well directed, one of the numerous players surrounding the post as guards may intercept it and throw it back into the field. In this manner a single inning may be continued for an hour or more. The game may come to a close at the end of any inning by mutual agreement of the players, that side winning the greater number of scores being declared the victor.

The ball used in this game is made by wrapping thin strands of

buckskin and covering the whole with a piece of the same. It is about the size of a base ball, though not so heavy.

The stick is of the same pattern as that used at the beginning of the present century by the Missisaugas, the Ojibwa of the eagle totem of the Province of Ontario. (See cut, p. 134.)

The game played by the Dakota Indians of the upper Missouri was probably learned from the Ojibwa, as these two tribes have been upon amicable terms for many years; the ball sticks are identical in construction and the game is played in the same manner. Sometimes, however, the goals at either end of the ground consist of two heaps of blankets about twenty feet apart, between which the ball is passed.

When the Dakota play a game the village is equally divided into sides. A player offers as a wager some article of clothing, a robe, or a blanket, when an opponent lays down an object of equal value. This parcel is laid aside and the next two deposit their stakes, and so on until all have concluded. The game then begins, two of the three innings deciding the issue.

When the women play against the men, five of the women are matched against one of the latter. A mixed game of this kind is very amusing. The fact that among the Dakota women are allowed to participate in the game is considered excellent evidence that the game is a borrowed one. Among most other tribes women are not even allowed to touch a ball stick.

The players frequently hang to the belt the tail of a deer, antelope, or some other fleet animal, or the wings of swift-flying birds, with the idea that through these they are endowed with the swiftness of the animal. There are, however, no special preparations preceding a game, as feasting or fasting, dancing, etc.—additional evidence that the game is less regarded among this people.

The Chactas, Chickasaws, and allied tribes of Indian Territory frequently perform acts of conjuring in the ball field to invoke the assistance of their tutelary daimons. The games of these Indians are much more brutal than those of the northern tribes. The game sticks are longer, and made of hickory, and blows are frequently directed so as to disable a runner.

NOTES ON THE NAMES OF THE HEAVENLY BODIES AND THE POINTS OF THE COMPASS AMONG THE POINT BARROW ESKIMO.—During our stay of nearly two years at the U. S. Signal Station, at Point Barrow, we were able to obtain the names of a few of the more prominent stars and constellations.

The sun is called *sŭ'kûnyû*, and the moon *tŭ'tkûñ*. They have no name for the pole star, but call the tail of Ursa Major *tŭ'ktoruin*, which appears to mean "the many reindeer." A similar name for this constellation has been noted both in Greenland and among the Central Eskimos.

Arcturus is called *sibwúdli*, and this star is the timepiece of the seal-netters during the great night-fishing in December and January. The position of this bright red star as it circles round the pole, enables them to judge how the night is passing. Altair is called *ágru;* Vega, *agrúlubwûk;* the constellation Cassiopea, *ibrosi*, and Orion's belt, *tu'atsan.* The Eskimo who gave me the above names—he called me out one bright starlight night, saying, "Now, I will tell you all the stars"—called the Pleiades *patû'kturin*, but Dr. Simpson, of the Plover, applies this name to the Hyades and Aldebaran. This is probably right, for the word evidently means "the sharing out or dividing," as he says, and Aldebaran and the group of the Hyades would very well represent the dead bear with the hunters around preparing to cut him up, as he describes.

We obtained the points of the compass with more exactness than Dr. Simpson did. They are: *únani*, in the north; *ukilyûñnámi*, in the northeast; *kábani*, in the east; *kawanikû'na*, in the southeast; *páni*, in the south; *awanikû'na*, in the southwest; *áwani*, in the west; *wălûñnámi*, in the northwest. The four cardinal points, however, *únani*, *kábani*, *páni*, and *áwani*, are the ones most commonly used, and are not employed with great exactness. *Páni*, in the south, is always used for places inland, often with special reference to the hunting grounds at the rivers. A man starting for the rivers always says "*pauñaniă'ktûña*," "I am going *southwards.*"

They have definite names also for the directions of the wind. When the wind blows from any point between north and east it is called *ikûñna*, when from any point between east and south, *nigya.* A south wind is *kiluû'ñna*; one from the southwest, which brings high water on the beach, is *úñala*; while *kûnû'ñna* is the name of the northwest wind.

JOHN MURDOCH.

ON THE EVOLUTION OF ORNAMENT—AN AMERICAN LESSON.

BY W. H. HOLMES.

Much has been written upon that ever fascinating topic—the evolution of ornament. All find within this theme the touch of nature that makes the whole world kin. The artistic sense is in some degree developed in the minds of all men, and through its intuitive and constant exercise art has become a rival of nature in the realm of the beautiful—a realm not more fascinating to the devotee of pure æsthetic pleasure than to the earnest but prosaic student of the evolution of culture.

America's lesson concerning this subject has never yet been given that full and careful consideration its importance demands, although that lesson is inscribed in lucid language upon every page of the native record. Of virile and spontaneous growth the art of embellishment in Ameriea furnishes many evidences of the correct eye, the facile hand, and the true æsthetic instinct of the native races.

It is impossible to trace back the idea of embellishment to its inception, for the presumption is that it came up from the shadows of the pre-human stage of our existence. It was probably first exercised upon man's own person, but later extended to those objects with which, from generation to generation, he had most constantly and intimately to deal. In the early stages of culture its exercise is not wholly an intellectual, but rather what I prefer to call an instinctive act, and under favorable conditions it so remains far into the stage of culture known as civilization; it does not cease to be measurably unerring in its action until intellect essays to perform the work of instinct—until men begin to think out results instead of feeling them out. The period that sees the full and free exercise of purely intellectual methods witnesses the end of ornament as a living growth. It is afterwards not a unit, a simple thing, a growth, but a composite thing, the parts of which can by no possibility come into full harmony with one another, for their relationship, one to the other and each to all, depends not upon spontaneous or instinctive impulses of the mind, but upon individual judgment,

fallible and uncertain even in the most enlightened minds of this enlightened age.

It is impossible to determine how far beyond the stage of æsthetic evolution, here referred to as instinctive, native American decorative art had advanced at the period of foreign invasion. A nation pursuing the normal course of progress, free from intrusion of ideas from distinct peoples or from higher planes of culture, long follows the lead of instinctive promptings and habitual methods in all decorative elaboration; with such a nation the elements of ornament are not independent or abstract conceptions transferable at will from art to art; they are essentially concrete, each art employing in its enhancement only those motives or elements that arise within the art, or that come to it from without for other reasons than those of mere embellishment.

It is within the limits of this primitive or elementary period that we may best begin the study of the evolution of ornament, for here the phenomena are homogeneous and the processes simple.

In this paper I desire to call attention to that portion of the æsthetic field which pertains to the surface embellishment of the handiwork of man, and more especially to certain set or conventional forms of decoration that, in advanced cultures, through obscure processes of abstraction and transfer, have been adopted into many branches of art and by many peoples. Such are the herring-bone, the cheveron, the guilloche, the meander, the fret, and the scroll.

In America two arts are particularly concerned in the early stages of the evolution of these designs, namely, the textile and the fictile arts. By many writers architecture has been given an important and probably a false place in its relation to the evolution of such decorative motives, since many of our aborigines employ almost every form of typical decorative figure in the two first named arts at a culture period long anterior to that at which the native architecture received the first touches from æsthetic fingers.

The elements of ornament utilized in these arts are, in genesis and in character, of two well-defined classes. Those of one class arise within these or cognate arts, and being of mechanical origin are wholly geometric. Those of the other class are derived from nature, and being delineative are primarily non-geometric, but the geometric elements, especially in the textile—the antecedent art so far as decoration is concerned—are first in the field and constitute the beginnings, the first steps of decoration. Delineative subjects

primarily have an ideographic office and when finally introduced into art as pure decorations serve to supplement, to modify, and to enlarge the realm of the geometric.

When these elements are once taken up by the embellishing faculty they are subjected to the action of two great forces, namely, the mechanical forces of the particular art to which they belong, or into which they are introduced, and the æsthetic forces of the human mind, and it is the combined effect of these forces acting within each art and upon each motive that finally produces the results which we here desire to consider.

All mechanical elements yield readily to the action of these forces and to all the changing requirements and conditions of art. Imitative features yield somewhat less readily to the same agencies, but they are gradually forced into unreal shapes by technical restrictions and in the end assume a geometric character no less pronounced than the technically born elements.

There arise here two questions: First, How do the technical elements inherent in the art develop into certain definite and highly constituted forms? and, second, What part do delineative or nature-derived elements take in producing or shaping corresponding results?

The desires of the mind constitute the motive power, the force that induces all progress in art; the appreciation of embellishment and the desire to elaborate it are the cause of all progress in purely decorative evolution. It appears, however, that there is in the mind no preconceived idea of what that elaboration should be; the mind is a growing thing and pushes forward along the lines laid out by environment. Seeking in art æsthetic gratification, it follows the lead of technique along the channels opened by such of the useful arts as offer suggestions of embellishment. The results reached vary with the particular art and are important in direct proportion to the facilities furnished by it. In this respect the textile art possesses vast advantage over all other arts, as it is first in the field, is of widest application, is full of suggestions of embellishment, and is inexorably fixed in its methods of expression. The mind in its primitive, mobile condition is as clay in the grasp of such forces.

In considering the first question, how do the mechanical elements of ornament develop into highly constituted forms? a close analysis of the forces and suggestions inherent in the arts is necessary. It will be observed that order, uniformity and symmetry are among the first

lessons of the arts, and especially of the textile art. From the very beginning the workman finds it necessary to direct his attention to these considerations in the preparation of his materials as well as in the construction of his utensils. If parts employed are multiple they must be uniform, and to reach definite results, either in form or ornament, there must be constant counting of numbers and adjusting of spaces. The most fundamental and constant elements embodied in the textile art and available for the expression of embellishment are the minute steps of the intersections or bindings which express themselves to the eye both by relief and color. These elements exist fortuitously and without design on the part of the artist. Now, the most necessary and constant combination of these elements is in continuous lines or in rows of more or less isolated figures; the most necessary and constant arrangement of these combinations is in lines following the web and the woof or their complementaries, the diagonals. If large areas are covered, certain separation or aggregation of the elements, relieved or colored, into larger units is demanded, as otherwise absolute sameness would result, a condition abhorrent to the æsthetic sense. Such separation or aggregation is governed to a certain extent by the form of the utensil constructed, but it conforms in every case to the construction lines of the fabric, as any other arrangement would be unnatural and impossible of accomplishment. Textile decorative elements or units—vertical, horizontal and oblique lines, dots, and spaces—therefore, combine and must combine in continuous zones or rays.

Other arts possess in a lesser degree the same classes of mechanical elements, and their technique leads by similar methods to corresponding results.

All agencies originating with man that may be supposed of importance in this connection, the muscles of the hand and eye and the cell structure of the brain, together with all possible preconceived ideas of the beautiful, are, in primitive stages of art, all but impotent in the presence of technique, and, so far as forms and methods of expression go, submit completely to its requirements. Ideas of the beautiful, in linear geometic forms, are actually based upon and originate in the consideration of technical forms; hence the selection for their beauty of certain figures developed in art is but the choice between products that in their evolution gave taste its character and powers.

From the foregoing we see that art furnishes various mechanically

derived elements or devices which combine from necessity in certain definite ways; that these devices and the suggestions they furnish are taken up and elaborated by the æsthetic sense. Through a consideration of all the known influences of mind and art we can determine the probable direction of this elaboration and the necessary character of the results, but it is impossible to show that any particular design of the highly constituted kind—the fret or the guilloche, for example—was derived through a certain identifiable series of progressive steps; for as in the evolution of natural forms—of species of animals and plants—the steps of progress are obliterated; and, furthermore, when we come to scrutinize the matter closely it is clear that any given design may have developed along more than one line and within the art of more than one race. The attempt to give more than a possible or probable genesis of a particular example of design must therefore be futile. Here, as in biotic evolution, we must be content to point out general tendencies and to discover general laws.

The second question, What part do delineations of life forms play in the development of set decorative designs? is now to be considered.

In a very early stage of culture most people manifest decided artistic tendencies, which are revealed in attempts to depict various devices, life forms and fancies, upon the skin or upon the surfaces of utensils, garments, or other objects. These figures are believed in cases to be of trivial nature, serving to amuse, but the weight of evidence tends to show that such work is generally serious and pertains to events or superstitions. The figures employed may in cases be purely conventional, but life forms afford the most natural and satisfactory means of recording, conveying, and symbolizing ideas, and hence predominate largely.

Figures having associated ideas of a superstitious nature come to be employed in all arts suited to their reception, and especially in those branches of art, such as basketry and pottery, extensively employed in superstitious offices.

Now, the fact has been noted and renoted that when natural forms are introduced into art certain modifications of form and character appear which are called conventions or conventionalisms. Such delineations vary from the most literal presentation of which the art and the artist are capable to forms so altered and abbreviated by the forces of convention that they are no longer readily recog-

nized as of graphic origin. These phenomena are well known, and when a large number of examples are considered they may be arranged in a series extending from the most realistic forms at one end of the line to the most mechanical form at the other, the latter presenting to the uninitiated eye a meaningless device.

What is now needed is an analysis of the conditions and forces concerned in this remarkable morphology. Confining our observations to the embellishing phases of art, we find that three principal factors are concerned: First, the æsthetic desire in the mind of man; second, the technical forces and other mechanical agencies concerned in the practice or utilization of the art; third, the association of ideas.

1st. It is the æsthetic idea that calls forth the effort and presses forward to further and further elaborations of embellishment.

2d. It is clear that each art is endowed with its own special technique, and that figures acquired from nature must express themselves in terms of the several techniques. If the construction is geometric the figures must take on a geometric character; if plastic a plastic character, and if graphic a graphic character. Other related mechanical agencies in a like manner take part in determining the character of the results.

3d. Associated with each graphic motive, as I have already pointed out, there is an idea, as otherwise it would not in primitive stages have come into use at all. The expression of this idea may or may not be essential or desirable to the decorator, but as long as it remains essential or even desirable, the tendencies of the first and second forces towards conventionalism will be restricted or neutralized by this necessity of graphically expressing the idea. This tendency to resist conventionalism constitutes what may be called the conservative force in art. If the idea is strong all the tendencies of art to trim, restrict, or expand will be in vain. The idea dominates the technique. It is in this way that some national art characteristics originate.

Nations practicing arts having pronounced tenchnical characters, such as weaving and architecture, and possessing at the same time few or feeble ideographic elements, will develop a highly geometric conventional decoration, while nations practicing arts with less pronounced techniques, such as modeling, sculpture, and painting, and who make ideography a prominent feature, will have a system of decoration characterized by imperfectly defined conventionalism.

Now, what result follows the united and simultaneous action of all these forces upon natural forms? It is plain that on the whole the conventionalizing agencies are the stronger; that they are to a certain extent irresistible; hence as the ideographic or conservative feature becomes gradually weakened, as it usually does with time, they gain full dominance, and all forms then lend themselves with the utmost freedom to the enhancement of beauty under the dominance of the mechanical agents and the demands of the æsthetic sense.

A few examples will assist in making these statements clear. Let us take an illustration from the textile art of Peru—from a body of products belonging to one period and to a single community.

It may be assumed that fabric-making had long been practiced and highly perfected by the Incas, and that geometric ornament had been very extensively employed when the weaver first essayed, prompted perhaps by æsthetic but more probably by superstitious motives, to introduce the delineation of a bird into his fabric. We will suppose that he attempted an ordinary graphic delineation, but that owing to the difficulties—the restrictions of the technique of the art—the best he could do is shown in Fig. 1.

Fig. 1. Fig. 2. Fig. 3. Fig. 4. Fig. 5.

The bird in textile art transformed by technical forces.

But this degree of elaboration could not be maintained under all conditions of the practice of the art, and lines were simplified, parts omitted, and forms accommodated to the technique and to the geometric outlines of the original technical ornaments until they could easily be introduced into or substituted for them. The bird delineations were reduced to bird-like figures which could be carried serially along the zones to be decorated and with as much ease as could the purely geometric figures. Thus these bird figures merged into the elements or units of which current ornaments—meanders, frets, and scrolls—were made up, as shown in Figs. 4 and 5. It is plain also, whatever the life form introduced, that when the delineation became reduced to this wholly conventional condition it merged with equal ease into the frets and scrolls, becoming undistinguishable from its otherwise derived neighbors. There is no

doubt that in time this introduction of nature-derived elements led to new forms and combinations and to great elaboration in purely conventional design. It may be noted also that the idea associated with the graphic bird may still be retained by the derivative geometric unit, and possibly it (the idea) may even finally extend to the whole line of units—to the current ornament.

In the plastic or the plasto-graphic arts conditions and processes are quite different from those of the geometric arts. Let us take one illustration of the introduction of a graphic design into vase-painting. Here the technical forces are neither so pronounced nor so rigid. With a free hand the decorator sketched in figures borrowed from mythological art and elaborated them according to his own idea of the demands of the subject and of the particular embellishment desired. But strangely enough we observe marked and peculiar conventionalisms some of which may be inherited or copied from the sister art basketry, but most of which are due to the inherent tendencies of the art. Let us examine briefly the nature of these. First. What effect has the shape of the vessel and the space at command to do with the form and character of the design? The spaces available for ornament are the neck, the shoulder, and the expanded portion of the body of the vessel. These form three encircling zones, separated by more or less abrupt changes in the profile of the vase. Now, any ordinary figure, as, for example, that of an alligator, introduced into one of these zones does not cover its whole extent, and a number of the figures must be introduced. This is readily done, but the narrowness of the zone tends decidedly to elongate each figure, and there is at the same time a marked, probably a habitual, tendency to unify the design by connecting the series of elongated figures in a linked or continuous line. It is not surprising, therefore, that such results follow as are traced in Figs. 6, 7, and 8.

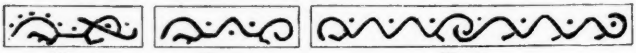


Fig. 6. Fig. 7. Fig. 8.

Alligator motive modified to suit varying spaces.

But again, if the spaces to be decorated are square or nearly so, as often happens, the result is very different, for the figure must be contracted and abbreviated in various ways to be included in the space, Fig. 9.

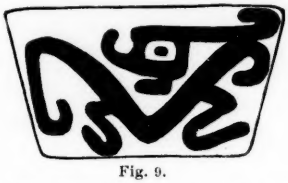


Fig. 9.

Alligator figure crowded into a sub-rectangular space.

And again, if the spaces are round or oval, distinct classes of results are reached, as is shown in Fig. 10. In such a case the figure, no matter what its nature, must be crowded or coiled up.

Fig. 10.

Reptilian figure modified by inclusion in a circle.

It will be observed that the free-hand method of presentation, even when there is no restriction as to space, results in conventions peculiar to itself. Instead of the sharply angular character seen in woven figures and to a considerable extent in engraved designs, rounded forms and flowing outlines appear; in place of the typical angular meander, guilloche, and fret, appear corresponding forms in curves—that is, the waved line, the twined or plaited lines, and the scroll.

In free-hand as well as in geometric introduction of life forms into ornament one of the most marked and constant tendencies is toward greater simplicity. This is due in part to the great difficulty of delineating the complex and subtile forms and partly to the necessity of extreme simplicity of elements that must accommodate themselves to eccentric spaces and to constant repetition in connecting series. Other cultures than those developed on American soil present kindred phenomena, though perhaps with less conciseness and clearness tell practically the same story of the natural history of conventional ornament.

A few of the salient points may now be briefly reviewed. It has been shown that in primitive stages of culture embellishment is

practiced instinctively and in habitual ways and after habitual methods, and that it utilizes elements inherent in the art practiced, supplemented later by ideographic elements appropriate to that art. That as intelligence increases habitual or instinctive methods give way to more purely intellectual methods and ornament is abstractly treated ; elements are freely taken from their original and consistent associations and, under the supervision of what we call taste, utilized in all arts in which embellishment is a feature, and it appears that this use being guided by individual judgment is necessarily incongruous and imperfect.

Owing to the peculiar conditions under which the American tribes existed, their ornamental art, although abnormally developed, had not passed so far beyond this primitive instinctive stage as to confuse the evidence relating to initial steps.

In America are found all the important conventional designs which characterize the art of the old world, and the oriental scroll and the classic fret were more freely used by the simple barbarians of the lower Mississippi and of the great Colorado plateau than they ever were by the Greek or by the Assyrian.

It has been shown that all geometric designs may have developed, and probably did develop, within the arts and from elements inherent in these arts; that this occurred through the æsthetic desire of the mind dominated by the mechanical forces of the arts, and that in this country the textile and the fictile arts are most deeply concerned in this evolution.

It is seen that as art progressed animate forms were gradually introduced into decoration, not because of their capacity to beautify, but on account of ideographic appropriateness ; that these life forms, when once within the realm of decoration, were acted upon by the mechanical forces of art and gradually reduced to purely geometric shapes ; that each one of these figures has in all probability a complex genesis, since almost identical forms may have been evolved by independent nations through any one or through many of the arts, or that any creature extensively portrayed in any art of any people may, through the mechanical conventions to which it was necessarily subjected, be transformed by imperceptible steps into any one or into all of the typical geometic designs ; and it may be added that, so far as ideography and symbolism are concerned, it appears from the above statement that *ideas associated with any one of our conventional decorative forms may be as diverse as are the arts, the peoples, and the original elements concerned in its evolution.*

CLIMATIC INFLUENCES IN PRIMITIVE ARCHITECTURE.

BY BARR FERREE.

Climatic changes, variations of temperature and rainfall, differences of geologic structure and of animal and vegetable products, the nature of the soil, and the topography of a country—in short, all the factors that constitute environment—are the most important and universal elements in determining the form and construction of the dwelling. Sociological influences, such as mode of life, government, mental status, and the like, are of importance chiefly in the earlier stages of society, and their effects upon architecture gradually lessen with the progress of civilization.

Climatic influences can be traced in our own buildings as well as in those of the most primitive races, in the structures of the nineteenth century as in those of prehistoric times. The builders of the great churches of Europe pitched the roofs at a high angle to permit the easy discharge of snow; in the milder climate of Italy such a course was unnecessary, and a lower or flat roof is found. Large windows, to admit light and heat from the sun, are the rule in the north, while small ones, to keep out the glare, are characteristic of the south. The very mouldings are frequently cut so as to carry off the water or to protect delicate carvings placed beneath them.

The influence of climate and of environment extends to the art of painting. The characteristic features of the various schools of landscape painting are largely the reflection of the environment of the artist. The history of culture and of civilization abounds in illustrations of the influence of environment upon the arts and development of man. In the earliest historical periods the most advanced races dwelt in warm climates, or those in which natural phenomena were uniform. The great nations of antiquity, the Egyptians, Assyrians, Persians, Greeks, and Romans, all originated and thrived in semi-tropical districts. In America the most advanced races, the Aztecs and Peruvians, were likewise inhabitants of hot countries.

It is a remarkable fact that the centre of civilization has shifted

from near the equator towards the poles. To-day the most progressive races inhabit the temperate zone, while the stolid and stationary ones are in the frigid and torrid where there is little variation of temperature. It would almost seem that a diversified climate, one of sharp contrasts of hot and cold, of rain and snow, was essential to a progressive civilization, and at all events it is in such that the intellect attains its most vigorous growth. In Europe the Germans and English are in advance of the Italians and Spaniards, and in our own country the people of New England claim to be ahead of their fellow-citizens in the south. In whatever direction civilization is tending, it is at least safe to say that a uniform environment throughout the world would result in uniformity in thought, in art, in manufactures, and in construction, and to variation in environment more than to any one cause differences in these particulars are due.

Among primitive peoples the influence of environment on construction is very marked, and to it differences can be traced which are not noticeable among advanced races. First of all may be considered the influence of wind. This was an important element in determining the development of the rectangular dwelling, which arose in a desire to exclude it. In part of Tasmania, for example, the natives used windbreaks, but in the western portion of the island, where the weather was more severe, huts were built of wattle and daub. A common method of gaining shelter, illustrated by the Australians and the Coroads, is by placing the entrance to leeward; very frequently no wall at all is built on this side, the ingenuity of the builders being confined to keeping the wind out on the others. The Bachapin houses have a number of devices for excluding the wind. They are surrounded by a fence of closely interwoven twigs and branches, with an opening that conforms to the shape of the body, being wider at the top than at the bottom. The house has two walls, an outer and an inner one; the former is of sandy clay, manure, or grass, thrust in between poles that support widely projecting eaves. The inner wall is without windows and encircles the portion of the house used for sleeping and storing purposes. The roof is constructed in a particularly thorough manner of poles bound with acacia bark, over which sticks are tied transversely, and covered with a thatch of long grass or straw, which in turn is held down by twigs inserted at both ends. Few structures exhibit so many special expedients to protect the inhabitants against the inclemency of the weather as this, but there is a very large class of dwellings,

especially in colder and more windy countries, that show attempts to exclude the air. A favorite device is a single small entrance, which was much used among the Indians of North America, and it need scarcely be pointed out that for this reason openings are closed with doors or shutters, or else a curtain, mats, skins, cloths, varying with the products of the country or the wealth and knowledge of the builders, is hung before them, and protection thus obtained not only against the severity of the elements but from prying eyes.

In some tropical regions it is intensely hot by day and cold by night, a condition of affairs that would naturally lead to the building of houses that could be opened in daytime and closed at night. An interesting example is furnished by the houses of Samoa, that have a low wall, the upper portion of which is closed at night by screens. A similar end is sought in the low circular huts of the Tartars of Central Asia. They are intolerably close by day, but at night, owing to the piercing winds, are as comfortable as they are necessary to the preservation of life.

In direct contrast to this system of construction, which is designed to exclude the air, is the system arranged to give it free access. The latter is to be found in all hot countries. Sometimes the dwelling is open at one end; at other times it is without any walls at all. The former may be found among the Tannese, the latter among the Adamese. The Tongans build in a similar manner, but with the roofs descending nearly to the ground. The shed, of course, is the form best adapted to permit the free circulation of air, and it appears in a great variety of forms. The Conibos Indians of Peru supply an excellent illustration, building in the clearings under the direct rays of the sun huge open sheds capable of accommodating three families. In the Hawaii Islands a different custom prevails, sheds being used in summer, and in the cold season dwellings with low walls and high roofs.

Rain also has an important influence upon construction. As has been noted, flat roofs obtain where there is little or no rain, pointed or inclined ones where there is an abundance of it. While this distinction is broad enough to be observed among all peoples, in all parts of the world, and in all degrees of civilization, there are a number of special expedients that have been devised by different peoples as the result of local conditions or their own knowledge. The Abipones, whose dwelling is so rude at to consist simply of a tent of two poles and a mat, dig a trench to carry off the rain. The

granaries, which almost invariably form part of an African village, are frequently furnished with projections that extend beyond the walls to carry off the rain. An interesting series of examples of the same regard for natural requirements is furnished by the stone edifices of more advanced peoples. In Syria and Egypt, where the rainfall is too light to be taken into account in construction, roofs are flat; in Greece and Italy, where it is light but periodical, the roofs are pitched at a low angle; still farther north, in central Europe, where rain and snow are abundant, the roof is sharply pitched. The richly domed roofs of India may have originated through the same cause. A leading characteristic of Indian architecture is a succession of pilaster-like ornaments, surmounted with a dome or roof covering. In a rainy district the simplest way to protect an upright column or post is by a covering, and it is quite likely that such a primitive arrangement may have suggested to the Indian architect the idea of his many domed walls where each upright member appears to have a roof of its own.

Differences in construction result from differences of temperature, as when the summers are short and hot and the winters very long and cold. Under these circumstances the usual method is to occupy a different dwelling each season. Summer houses are light in structure while winter ones are built with a regard to warmth. The Chippewa, for example, in summer use a primitive structure formed by two poles meeting at the head, a ridge-pole, and a strip of birch bark. In the winter they build circular lodges accommodating two families, covered with birch bark held down by sticks; the entrances are closed with blankets. The Comanches have arbors of green boughs in summer and conical lodges of buffalo skins in winter. The Indians of Cooper's creek use windbreaks of branches or stalks of marsh-mallows in summer, and in winter rain and wind-proof lodges of sticks covered with grass or weeds with earth or sand thrown on the top and beaten down. In fact, the practice of building two kinds of dwellings for the different seasons is very common among the American aborigines. A similar custom is found among other peoples. The Ostyaks build huts of birch bark for the summer and for winter yurts of wood and earth, with floor sunk in the ground for greater warmth. These winter houses are occupied by several families, while the summer ones are used by one only. Other north Asian peoples, as the Kamtschatdales and Tschutski, have similar arrangements. The summer houses of the former are elevated

on posts, while the winter ones are partly sunk in the ground. The Innuit live in tents of skins during the summer; as the weather becomes colder they build combination houses of sheets of ice with a roof of skins, and when the winter has finally set in they resort to the typical house of blocks of snow and ice. The Todas, though living in a warm region, have duplicate and triplicate dwellings permitting a seasonal change of abode, a sort of primitive "town" and "country" house arrangement.

A change of dwelling is not, however, necessarily confined to districts having strongly marked seasons, but is sometimes due to change of occupation. The Brokpas of the Upper Indus build separate houses in the fields in summer, while in winter they use communal dwellings. Thus each family is enabled to cultivate its own piece of land in the warm season, while the whole tribe huddle together for greater warmth in the winter. The Zuñi and other pueblo tribes of New Mexico adopt a similar method. The Dakotahs erect permanent communal dwellings of birch for the use of the agriculturists in summer, and at other times live in temporary lodges of skins, thus reversing the process of the Brokpas. Temporary tents of poles covered with mats are used by the Chinooks during the fishing season, and permanent board dwellings at other times.

The leading climatic features that have been considered produce what may be termed special variation in structure. These factors, wind, rain, snow, and change of season, do not produce uniform effects, some tribes building more with reference to one than to another. They may, therefore, for the sake of convenience, with the additional element of earthquakes—which cause readily recognized features wherever they occur—be classed together under the general term of secondary climatic agencies.

But there is a much more important element due to climate, and that is the material employed. Difference in material is traceable to the influence of climate and geological formation, and to this cause chiefly is to be attributed the many variations in structure to be found in all parts of the habitable globe.

The want of an abundant and readily procured building material is productive of all manner of expedients. In a treeless country the first resort is to skins. Numerous illustrations of this were to be found among the North American Indians before their habits were changed by civilization. The Comanches, the Dakotahs, the Chippewayans, and the Snakes are but a few of those who used

skins for the want of a better material, although it is to be remarked that for the dwellings of nomadic tribes skins are the most serviceable material. The Patagonians and the Arabs used skin tents because timber was scarce. The Mandans were extremely sparing in the use of logs in their houses, for in the region in which they dwelt trees grew only in patches, and being confined to the bottom lands between the banks of the rivers were difficult to transport.

From the use of skins the next step was to the use of clay. The rudest method is simply to spread it over a wood frame-work, as was done in the case of the Mandan huts. This, however, implies only a slight advance in technical skill. A higher stage is exhibited in the houses of the Ashantee. These are formed of a slight frame-work of wood, thickly coated with clay, and smoothed off to resemble columns and paneled walls, a system not very unlike that of the Chaldæans and Assyrians. These structures form a sort of stepping stone to the use of brick, which is at once the highest and most developed method of employing clay as a building material, though moulded terra cotta may be considered to be a still further specialized form of it. The Afghan huts furnish an interesting series. Some, as at Khandahar, are entirely of mud bricks, no wood at all being used, not even in the roof. Others, as in the Pischin valley, have roofs partially constructed of wood, which is carefully carried in each migration. The settled Arabs of Asia usually build with sun-dried bricks. In the case of more advanced peoples there may be noted the use of brick in Assyria and of stone in Egypt, the material in each instance being the most readily obtainable. It would have been quite impossible for Assyria to support its population had it not been for the use of clay as a building material. The arch was first used in treeless countries, or at least where large building materials were not to be had, and may be said to have originated in the use of clay. The adobe houses of North America owe their origin to the absence of any other suitable material or the difficulty of obtaining one.

Some of the above examples show peculiarities of construction due to the presence of certain kinds of materials only, but there are instances where a choice has been made among several kinds of materials. Squier describes houses at the mouth of the Rio Ranees, in Peru, that are built of a peculiar tough turf found in the vicinity. Tule is used in the rainless districts of Peru and California. The use of a certain abundant substance in one district results in pecu-

liar methods which are absent in structures in which they are not used.

The use of stone as a building material resulted from the want of a better and more easily handled substance. The first stage, where some timber can be had, is to build a wall of stone and a wooden roof. Such dwellings are found among the Maiwar Bhils. Stone forms the fabric of the most important edifices of Egypt, and the Doric temple itself, as M. Viollet-le-Duc has so ably shown, is a stone structure admirably designed and executed and expressing in the minutest details the adaptability of the material to the various uses to which it is put. The size of the stone has an important influence on the appearance of the building and the method of construction. In the stone pueblos of America three kinds of walls were used—one of alternate layers of large and small stones, another of layers of large stones, and a third of rubble-work. Lintels are found where large stones can be obtained and arches where only small ones can be had. Incidentally, also, the use of small stones led to the introduction of plastered or stuccoed surfaces.

The Egyptians built hugh columns of small stones, covering them with plaster in order to produce the effect of monoliths. The grand yet simple results of Greek architecture were obtained chiefly by the use of large materials, while the richness and variety of the Gothic results from the constant use of small stones. The Romans relied almost exclusively upon the plaster coating or veneer of costly marble laid on walls of ordinary brick for the full effects of their buildings. The use of courses of stone naturally suggested the ornamentation of each row or of certain rows. Soft stone was still further instrumental in the development of ornament. Lastly, it may be noted that a taste for polychromy follows the presence of varied colored stones. The rich appearance of the buildings in the volcanic districts of France furnishes ample illustration. Stone was a substance not much employed by primitive builders, as its use implied considerable technical knowledge, and no works of importance could be accomplished except by means of the concerted action which is only found in semi-civilized or civilized communities. A number of stone huts are to be found in various parts of Europe, dating from a remote past if not from prehistoric times, that are scarcely more than stones piled up with more or less regularity. Few of these exhibit half the care and labor to be noted in the dwellings of the most primitive Africans.

Artificial building material came into use when no other was at hand and when the tribe possessed sufficient technical knowledge to produce it. The Kalmucks use frames of willow covered with felt, made of a number of pieces fastened together with thongs or hair ropes. The Khirghiz build similar tents, but made of reed mats held down by bands embroidered with needle-work. These mats are covered with an outer layer of felt, held in place by white belts crossing each other in various directions. The yurtas of Mongolia are formed of a lattice of wooden laths brought from the Khalka country, where they abound. The roof is of light poles, and the whole is covered with sheets of felt that are doubled in winter. The completed tent bears a close resemblance to a heap of earth, an appearance that may have been sought as a protection against enemies.

Sometimes a material is used because it is the most convenient, though a better may be had with little trouble. The Chinese mud hut is a case in point. It is composed of mud and millet stalks and has numerous advantages in the eyes of the natives. The materials can be had on any plain for the mere picking up. In addition each man can build his own hut, an advantage not to be despised where incomes are microscopic. When the floods and the rain threaten to dissolve the habitation, the owner takes his family and household goods to the roof, and as the water gradually disintegrates the walls the whole structure sinks softly down, safely preserving the precious freight. The ranchos of Chili, built of twigs and rushes and plastered with mud, are constructed so as to be easily taken down and rebuilt.

Closely allied to houses built entirely of mud are those constructed of wattle and daub. Such dwellings are of frequent occurrence, and illustrations are supplied by the Mundrucus of Brazil, the Araucanians, the Malagasys, the Gonds, and many others. In the northern interior of Australia the natives constructed huts of boughs covered with grass and leaves, with a thick outer covering of mud. The Fuegians sometimes placed turf above their shelters of skins, bark, or grass, and the dwellings of the Ostayks, the Tschutschi, and the Oonalashka are all covered with earth. Such structures are to be found not only where better material is wanting, but where the people are too indolent to devise better methods.

Further variations in buildings are due to the fact that a peculiar material is within reach which gives a character to the architecture.

The light and graceful character of the dwellings of eastern Asia is due to the abundance of bambu. Among the people using this eminently adaptable material are the Nagas, the Khryings, the Javanese, the Sumatrans, and a host of others. It is the foundation of all east Asian building, and though it reached its highest form and fullest development with the Chinese and Japanese the less advanced races well understood its capabilities and made good use of it. The Javanese houses are built of a frame-work of bambu and poles covered with plaited bambus or reeds. The roofs are of reeds, leaves, or pieces of bambu split and applied to each other by their alternate concave and convex surfaces. The floors are of split bambus. The Sumatran dwellings are largely built of palupo, which is bambu opened and made flat by notching the joints on the outside, cutting away the insides, and drying the shell in the sun. It is sometimes fastened with nails, sometimes woven together. The floors are of bambu, with an upper layer of split ones. The roofs are varied. Some are covered with palm leaves, formed into sheets, doubled at one end over a lath and tied to the rafters; others are of narrow split bambus laid so as to form a triple covering; others are covered with a substance resembling horse-hair; and still others have split bambus arranged as in the Javanese houses. The high arched roofs of the New Guinea houses are due to the elasticity of the bambu. It is generally used throughout the east for floors even if in no other part of the dwelling, as it is more readily worked than palm wood. All these structures exhibit the simplest and most obvious applications of bambu to the needs of construction, but the full development, as seen in the houses of China and Japan, is so close to the methods of civilization as to remove them from the scope of this paper.

Other trees tend to the formation of characteristic structures. Palm leaves are extensively used for thatching wherever they are found. In the Brierly Islands the houses are built of slender poles lashed together with rattans and thatched with grass which still has the roots attached to it, over which are placed a few leaves of the cocoa palm. In the dwellings of the New Zealanders and the Waraus palm is also employed as a thatch. The Arawaks of Guiana build their houses entirely of palm. Grass is also very generally used for thatching purposes.

Bark, when it can be obtained in sufficiently large pieces, forms an excellent building material. Examples of its use have already

been noted in the shelters of the North American Indians and the Australians. In high latitudes a variety of expedients are resorted to in order to supply what nature has denied. Snow and ice are pressed into service when nothing else is to be had, and form good and serviceable shelters. No useful substance is permitted to be wasted, and driftwood is treasured when it can be obtained. The Innuit usually build with snow when they can get no drift-wood. The bones of animals are sometimes used, so pushed for means of shelter are those living in the extreme north. The Tschutski build a frame-work of wood and whalebones, and other northern people construct dwellings entirely of the bones of whales, walruses, etc. These structures are circular, dome-shaped huts of ten or eighteen feet diameter; the lower part is of stone, the upper of bones, that gradually incline inwards, meeting at the top. The crevices and the outside are covered with earth, and in the winter an additional layer of snow is carefully spread over all.

Apart from the use of animal skins and bones in building the dwelling there are certain structural devices intended to prevent the living animal from interfering with the comfort and safety of man. Some authorities affirm that the abundance of reptiles in the island of Timour led to the custom of elevating the houses on posts. In the dwellings of the Brierly Islands, which are also elevated, a special device is introduced as a guard against rats, consisting of an oval disk placed between the joist and the post. In some parts of Africa it has been stated that the natives build their huts in trees as a protection against lions. Nearly all African granaries are elevated on posts to keep the grain safe from the ravages of rats. The records of African travel abound with accounts of the ravages of the dreaded white ants and the care that must be taken to protect everything edible in the way of wood or other substances.

Some few of the leading characteristics of primitive architecture have been passed in review. Viewing the subject from the standpoint of the influence of the environment only, many features which are to be attributed to sociological influences have been omitted.* Limiting ourselves to this position, it is evident that however spontaneous architecture may be at the present day, however much it may be the creation of the fancy, the expression of a refined and cultivated

*See "Sociological Influences in Primitive Architecture," *American Naturalist*, January, 1888.

taste, a desire for the odd or the beautiful in its earliest conception, its rudest forms, it was nothing more than the action of the environment on the mind of man. If the climate was warm he built himself a dwelling that gave him as much air as possible; if it was cold all his resources were devoted towards obtaining heat. If it rained regularly or constantly he gave his roofs a sharp incline; if there was no rain the roofs were flat and afforded a pleasant place of resort in the cool of the evening. If there was no stone he made bricks, and if a pliable wood was at hand he devised a light form of structure the very ornamentation of which was in harmony with it.

In primitive architecture there was no effort for effect—no loss of material; primitive man had neither the time nor the intellect to spend on structures that are dictated solely by fashion or caprice. He advances slowly and with caution, evolving beforehand his methods of procedure. From natural shelters like caves he gradually progresses through the various stages of a single windbreak to a partially closed hut, and finally to the perfected form of an enclosed dwelling. In the case of sedentary tribes these dwellings are constructed with great care and skill, and sometimes attempts at ornamentation are made. With nomadic tribes there is less architectural advancement, but each applies his knowledge and means as best he may. To us, with our comfortable homes, our huge hotels, our gigantic office buildings, our churches, our theaters, our railway stations, our factories, our elevators, our steam heat, our electric light, and the thousand and one conveniences and necessities of modern life, the structures of primitive peoples appear meager and insufficient. It should be remembered, however, that many of our modern conveniences are intended to supply artificial wants and that the necessities of to-day were unknown the day before yesterday. The hut of the Adamese doubtless answers all his ideas of comforts and is eminently adapted to the life he leads. We, on the other hand, are constantly striving for changes and improvements and are never satisfied with the best results we can obtain. Primitive architecture may be stationary—it may exist in forms to-day that were employed thousands of years ago—but it is the faithful reflection of the environment and is thoroughly suited to the uses to which it is put. No further confirmation of this is needed than the fact that when Europeans take up their abode in tropical countries they follow the native methods of architecture so far as a prejudiced judgment will permit.

Nothing can be more rash than to attempt to formulate a law of architecture. The records of primitive architecture illustrate no law other than the action of environment and sociology. We may indeed say that man uses the best material known to him in the best way he can. This is, in fact, but one of the great principles underlying all architecture, both primitive and civilized, though perhaps it is best illustrated in primitive forms.

BRASILIAN INDIANS.—An important paper on the Indians of Brasil has recently appeared in *Archivio per l'antropologia e la etnologia* (the journal of the Italian Society of anthropology, ethnology and comparative psychology, published at Florence). The paper is by Dr. Alfonso Lomonaco, and is entitled "Sulle razze indigene del Brasile, studio storico." It occupies pages 17–92 and 187–270 of the first two numbers of the current volume (v. 19, 1889) of the *Archivio*. The paper begins with an introduction, and is divided into four sections, as follows: part 1, "The native races at the time of the discovery of Brasil," treating of the Tupy, the Tapuyas and the Aymores or Botocudos; part 2, "Brief remarks on the history of the natives of Brasil from the discovery of the country to the present epoch;" part 3, "The present native tribes of Brasil," treated under the following headings: "The present number of savages in Brasil; their subdivisions, based on the classification of Martius; the Tupis; the Ges or Crans; the Goytorkazes; the Guerens or Crens; the Gucks or Cocos; the Parecis or Parexis; the Guaycurùs; the Arnaks; the tribes of the Rio Purùs studied by Chandless; the tribes of the Xingù and of the upper Amazon; mixed races of Brasil; domesticated Indians; the future of the present natives; conclusions;" part 4, "Language and literature of the natives," including twenty-three Tupi legends collected by Dr. Cortes de Magelhaes.

A short bibliography is appended to the paper and a plate of typical Brasilian Indians.

JOHN MURDOCH.

THE OLECRANON PERFORATION.

BY DR. D. S. LAMB.

In a collection of sixty-nine skeletons and parts of skeletons of prehistoric Arizona Indians from the valley of the Salado I found that 54 per cent. of the eighty-nine humeri showed the olecranon perforation; forty-three of the right side, with nineteen foramina, or 44 per cent., and forty-six of the left side, with twenty-nine foramina, or 63 per cent.

In another collection from ruins of the ancient Seven Cities of Cibola, near Zuni, New Mexico, were sixty-one humeri, with twelve foramina, or 20 per cent.; thirty right humeri showed two foramina, or 7 per cent.; thirty-one left, ten foramina, or 32 per cent.

In a third collection of Indian bones from mounds in different parts of the United States, including New York, Maryland, Illinois, Wisconsin, and Dakota, there are sixty-two humeri, with seventeen foramina, or 20 per cent.; thirty-five right, with seven foramina, or 20 per cent., and twenty-seven left, with ten foramina, or 37 per cent.

The Army Medical Museum also contains forty-eight skeletons from nineteen of the existing tribes of Indians. Of these ninety-six humeri the foramen is present in but five, or 5 per cent., a remarkable contrast with the prehistoric races. One of these skeletons showing the foramen is of a Sioux only about twenty years old.

There are eight skeletons of negroes and mulattoes with but one olecranon foramen, or 6 per cent. Standing alone, this would seem to favor the statement of Pruner-Bey and others that the foramen is not present in the negro race. There is a skeleton of a Chinese woman showing the foramen present on both sides, and one of a Frenchman showing it on one side.

In the pathological series of the Museum are 298 humeri, with twenty-two foramina, or 7.5 per cent. Of these humeri 160 are of the right side, with six foramina, or nearly 4 per cent., and 138

left, with sixteen foramina, or nearly 12 per cent. These bones are nearly all from soldiers in the military service, and principally white, thus disposing of the suggestion that the foramina are found only in the female sex. One of the injured bones is from a Mexican boy.

With few exceptions the skeletons in the Museum are either infantile or adult. It is the more interesting, therefore, to know that of the adolescents two show the foramen.

In my own private collection of humeri, twenty in number, there are six foramina, or 30 per cent.; eleven are of the right side, with two foramina, or 18 per cent., and nine of the left, with four foramina, or 44 per cent. These humeri were obtained from cadavers used in dissection, and as most cadavers in this locality are of negroes or mulattoes it is reasonable to suppose that most of these humeri are from the negro race.

A review of the humeri in the above collections shows that the foramen was found in the proportion of 13 on the right side to 27.5 on the left, or more than twice as often on the left side.

The examination covered nearly 650 humeri and seemed to establish—

1st. The greater frequency of the foramen in the ancient peoples.

2d. Its greater frequency on the left side.

3d. Its occurence in adolescents, as well as mature individuals, in both sexes, and not confined to any one race.

The most important question which arises is as to the use and significance of the foramen. It is obvious that the more the coronoid or olecranon fossæ are deepened the thinner becomes the partition, and a step further produces a perforation. This deepening and perforation increase the extent of flexion and extension of the forearm. What was there in the habits of the prehistoric and ancient peoples which needed this increased flexion or extension and resulted in the foramen? and why should this be more frequent on one side, and that side the left?

To arrive at a solution of these questions it seemed necessary first to ascertain in regard to its presence in the lower animals and compare the results with their habits.

I accordingly examined the specimens displayed in the United States National and Army Medical Museums. Some perforations appear to have occurred in the preparation of the specimens, and

these I did not count. There was seldom any difficulty in distinguishing the true foramen, which always has a smoothly rounded, usually oval, margin; no such opening could be produced by accident. Species are illustrated in museums by single specimens; occasionally by two or more. The presence or absence of the foramen in any one specimen cannot be taken as an index for the species, since it may be simply an individual variation; but where specimens of several species of the same genus show it, we are justified in assuming its common occurrence in those species, if not in the genus.

When the foramen is large, especially when the animal is young or small, I think we have a more certain indication of its common occurrence in that species than where the opening is small and therefore more possibly a variation. I believe that the foramen is formed in the latter part of the period of development of the individual; it is much more rarely found in the early part, although I cannot be so certain of this, because the museums contain but few skeletons of the earlier periods.

The foramen has not been seen in any but the Mammalia.

The testimony for the anthropoid apes is as follows: Several authors (29, 42, 49) have noted it in the chimpanzee. Hartmann, however, found it but once in four cases, and then on the left side. I have seen one specimen. It has been seen in the gorilla (47, 48, 49). In Kneeland's case it was only on the right side. Hartmann found it twice in four individuals. I have seen two specimens, one an old female with the openings, the other an old male without them. Hartmann failed to find it in the orang-utan, and Desmoulins says it does not occur. I have seen three specimens, in two of which it was present and the openings were large. Mivart says it is sometimes present in the gibbons (*Hylobates*); Desmoulins that it is not found in *H. syndactylus*. It was absent from two specimens, a *H. lar* and *H. leuciscus*, which I have examined.

The old-world monkeys include more than a hundred species. The testimony for the *Colobinæ* is negative. Meckel says it is present in the *Cercopithecinæ*; Mivart that it is found sometimes in the green monkey. I have seen it in this and also a vervet, but only on the right side. Meckel says it is present in the white-crowned mangabey; it was absent from the sooty mangabey. Mivart says it is sometimes present in the genus *Macacus*. I have seen it in the toque monkey. It was absent from the bonnet monkey and black

ape. The best testimony is for the dogheaded baboons. Meckel found it in the Arabian baboon. I have seen it in the anubis and in one of two chacmas. Meckel says it is present in the mandrill, and I have seen it in three specimens, one a young animal, and both the foramina large.

Of over a hundred species of new-world monkeys and marmosets I have seen thirteen specimens representing nine species, and did not find any foramina; neither do authors mention their presence.

It was absent from two specimens of *Indris*, from the ruffed and slow lemur. Blainville and Mivart found it in the slender lemur, and I have seen two specimens which showed it; in one the openings were very large. Mivart says it is sometimes present in the awantibo.

Passing to the Carnivora, Blainville says it is not present in the cats, about sixty-six species, except the pampas cat of South America. I have seen it in one ocelot on both sides, but in specimens representing eight other species it was absent. Blainville mentions its presence and I have seen it in some of the civets. A specimen of the aard-wolf showed it. Meckel and Arens say it is present in the hyenas, including the fossils. Blainville found it in the striped hyena, and I have also seen it. Filhol shows it in *Hyænodon*.

Blainville, Meckel, and Arens all speak of its constancy in the dog. All the species I have seen showed it, the only exceptions being an Eskimo-dog and a *Dachshund*.

Of seventeen out of nearly a hundred species of weasels the foramen was found, so far as I know, only in four—tayra, *Mellivora Capensis*, *Mydaus*, and American badger. It does not appear to have been seen in the raccoons or bears, nor in any of the aquatic Carnivora.

The Ungulata.—It is absent from the ox, sheep, goat, giraffe, and camel, and from the deer, except perhaps the roe, in which Arens has seen it; but the specimen I have seen did not show the foramen. I have found it in a specimen of the Javan chevrotain, but absent from two others. Generally speaking, therefore, we may say that it is absent from the deer. The prong-horned antelope affords a striking contrast. I found the opening in four out of five specimens. Out of over 200 species, therefore, of the section Pecora the foramen may be said to be present in but one.

In contrast with the Pecora the foramen is generally present in the Suina. All of seven specimens of the collared peccary showed it; one was a young animal; another had just matured. Arens says that the foramen is present in the whole family. Blainville found it in the wild hog and babiroussa, and Meckel in the common hog. Arens discredits the latter, and of about a dozen specimens which I have seen it was absent from all; most of these, however, were young. It may be that domestication has changed the habits of the hog. The opening has been seen in Pallas's wart-hog and the Liberian hippopotamus.

The Perrissodactyla afford some striking contrasts. The horse, rhinoceros, and elephant do not show it. It has been seen by Blainville in the daman. Blainville, Meckel, and Arens all found it in the American tapir. Of the six species I have seen four, the American, Malay, white-lipped, and Baird's tapir. Of eight specimens of the latter, sixteen humeri, there were three foramina on the right side, six on the left. Three of the specimens were young animals, in two of which the opening was absent; in one, absent on the left side.

Blainville and Cope mention its presence in some of the fossil Ungulata.

The Sirenia and Cetacea do not show it.

Out of more than 700 species of rodents the foramen was found in four of the squirrels; eighteen other species representing seven genera did not show it. It is absent from the beavers and gophers. It has been seen in three out of about 330 species of rats. The common rat and mouse do not show it. It has been seen in some of the octodons; in some of the agoutis, spotted cavy, guinea pig, and capybara. The large size of the opening in the Javan porcupine, golden agouti, guinea pig, and capybara is worthy of mention. All of the hares show the foramen.

It is probably constant in some of the Insectivora, as the tenrec and common hedgehog; I have also seen it in *Solénodon cubanus* and the South African hedgehog. Blainville found it in the *Tupaiidæ* and he and Meckel in the flying lemurs. It was absent from the moles and shrews.

It is also absent from the bats and endentates, and probably the marsupials.

The olecranon perforation in the lower animals.

Chimpanzee, frequent.
Gorilla, frequent.
Orang-utan, frequent.
Gibbon, rare.

Colobinæ, absent.
Cercopithecinæ, occasional.
Mandrill, constant.

New-world monkeys, absent.

Slender lemur, constant.

Cats, absent.
Civets, common.
Hyenas, constant.
Dogs, constant.
Weasels, occasional.
Raccoons, absent.
Bears, absent.
Aquatic carnivora, absent.

Ox, absent.
Sheep, absent.
Goat, absent.
Giraffe, absent.
Camel, absent,
Deer, absent.
Prong-horned antelope, constant.

Peccary, constant.
Wild hog, present.
Domestic hog, absent.
Hippopotamus, present.

Horse, absent.
Rhinoceros, absent.
Elephant, absent.
Tapir, nearly constant.
Fossil Ungulata, sometimes.

Sirenia, absent.

Cetacea, absent.

Squirrels, rare.
Beavers, absent.
Gophers, absent.
Rats, rare.
Octodons, common in some.
Hares, constant.

Tenrec, constant.
Hedgehog, constant.
Moles, absent.
Shrews, absent.

Bats, absent.

Edentates, absent.

Marsupials, absent.

Monotremes, absent.

Several authors (1, 16, 27, and 28) have mentioned the occurrence of the opening in the lower animals. Mivart (42), p. 310, says: "The coronoid fossa is generally shallower in the Lemuroidea than in the Anthropoidea. A perforation extends into the olecranal fossa in some. This is very large and constant in *Loris*, but it is also present in *Troglodytes* and *Simia*, and sometimes in *Hylobates*, man, *Cercopithecus*, *Macacus*, and *Arctocebus*. The olecranal fossa is sometimes deep, as in the *Simiidæ*, especially the *Cynopithecinæ*. It is less so in man, and still less so in the lemuroids, especially in *Indris*."

Many works on human anatomy mention its occurrence in the human subject. (See 1 to 19, 22 to 27, and 42.) Meckel, 1825 (28), says that it is sometimes found in man, but is small; that the inferior races show it perhaps oftener than the superior. He found it especially in negroes and Papuans. Desmoulins, 1826 (29), mentions a Hottentot skeleton which showed the foramen, and refers to its being found in the Bushmen and Guanches, and states that in this respect they differ from the Mongols. He was in error as to the latter.

Dr. Jeffries Wyman (30), in 1853, examined at the *Jardin des Plantes*, Paris, the skeletons of seven full-blooded negroes; seven of the fourteen humeri, or 50 per cent., showed the foramen; in three subjects it existed on both sides; in one, only on one side.

In 1862 the Boston Society for Med. Improvement discussed the subject (30), and specimens from Indian mounds were shown. In 1863 the Anthropological Society of Paris took it up (31 to 37). Broca inaugurated the discussion, which recurred at intervals till 1881. Broca, Pruner-Bey, and Lagneau were the most prominent speakers. Perforated bones were shown from different parts of Europe: as the caverns of Montmaigre; sepulchre of Chelles; excavations of Chamont (stone age) and St. Etienne; Furfoz (reindeer age); caverns of Ariége; a Parisian cemetery of the XVIIth century; cavern of Frontal, Belgium; from the Ardéche; Vaureal, and Charreouy (polished stone). Pruner-Bey believed that the foramen was found only in women, because all the perforated humeri that he saw were small.

Verneau, 1878 (36), stated, in regard to the Guanches of the Canary Islands, that the humeri were robust, twisted, and often perforated; that the frequency of the foramen surpassed any previously known. In one grotto he found sixty-nine perforated humeri out of 150, or 46 per cent.; in other grottoes, a less per cent., but still high; and sometimes the foramen was of uncommon size. He did not find the anomaly among the present people of the islands.

Thulié, 1881 (37), stated that in the Bochimans the humeri were small and slender and the olecranon cavity perforated like the Guanches, some Egyptians, and many prehistoric humeri.

The subject was also discussed by the International Congress of Anthropologists, Paris, 1867 (38). Broca claimed that it had no connection with the rank a people held in the scale of races, and that the foramen constantly became rarer since prehistoric times. During the discussion it was stated that the opening had been seen

in the humeri of natives of Peru, Bolivia, and Mexico, and also in the Kalmucs.

The following is a list of collections, numbering sixteen humeri and upwards and arranged in the order of highest percentage of foramina:

No. of humeri.	No. of foramina.	Per cent.	Authority.	
89	48	54	A. M. M. col.	Prehistoric Arizona Indians.
150	69	46	Bull. Anthrop. Soc.	Guanches, Canary islands. (Verneau.)
30	------	36.2	Topinard	Yellow and American races.
32	------	34.3	"	Polynesians.
80	------	31.2	"	Indian mounds of U. S. Wyman, Peabody Museum.
20	6	30	The author	Private collection, mainly negro and mulatto.
62	17	28	A. M. M. col.	Indian mounds, U. S.
67	18	28	Pruner-Bey	From Vaureal, France.
122	------	25.6	Topinard	Guanches of Canary islands.
156	------	21.8	"	Dolmens and grottoes around Paris. Polished stone.
97	------	21.7	"	African negroes.
61	12	20	A. M. M. col.	Prehistoric Indians, ancient cities New Mexico.
28	------	14.1	Topinard	Melanesians.
30	------	12.1	"	Dolmens. De Quiberon.
66	------	10.6	"	Caverns of l'homme mort, Lozere. Polished stone.
388	------	10.6	"	Dolmens, Lozere. Polished stone.
288	22	7.5	A. M. M. col.	Mostly white soldiers.
27	2	7	Anthrop. Soc., Paris	Bulletins. From Chamont, stone age.
16	1	6	A. M. M. col.	Negroes and mulattoes.
200	------	5.5	Topinard	Parisians from IVth to XIIth centuries.
96	5	5	A. M. M. col.	Cotemporary Indians.
150	------	4.6	Topinard	Parisians of Cemetery of Innocents. (Hamy and Sauvages.)
* 218	------	4.1	"	Parisians of Middle Ages. (Broca and Bataillard.)
52	------	3.8	"	Europeans of America. Wyman, Peabody Museum.
* 218	7	3.2	Bull. Anthrop. Soc., Paris.	Paris cemetery of XVIIth century. Broca.
30	0	0	Topinard	Long barrows of England, bronze age.

* Probably same collection.

Dr. Wyman, in the Peabody reports of 1868–'78 (39), states that out of eighty humeri from the mounds of the western states and Florida twenty-five, or 31 per cent., were perforated; fifty-two

humeri of Europeans examined by comparison gave only two cases, or 3.9 per cent.

Dr. Montané, 1876 (40), presented six specimens of the foramen found in the island of Cuba to the Havana Academy, and said they were of the Chinese race.

To sum up the foregoing: Meckel mentions its frequency in the Papuan; Meckel and Wyman in the negro, and I am inclined to agree with them, although Broca, Lagreay, and Pruner-Bey doubt it; Broca, Pruner-Bey, and Desmoulins in the Hottentot; Desmoulins and Thulié in the Bushmen; Pruner-Bey and Thulié, its occurrence in the Egyptians; Broca, Desmoulins, Lagneau, Thulié, and Pruner-Bey all put the proportion high in the Guanches, and Verneau says it is not found in the present race of the islands.

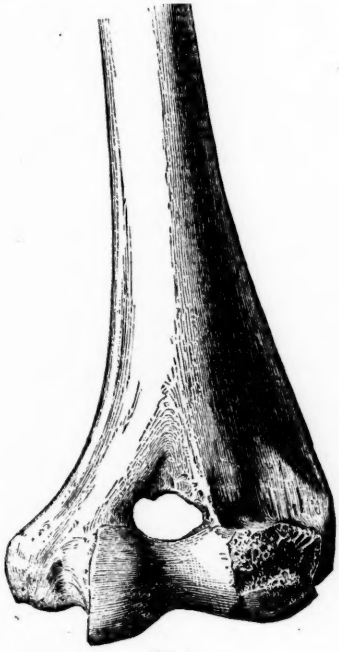


Fig. 1.

The accompanying figure 1, natural size, is of the lower part of a left humerus, from the Salado Valley (Hemenway) collection; it

was made by Dr. J. C. McConnell, of the Army Medical Museum. The foramen is quite large, as are most of those in this collection.

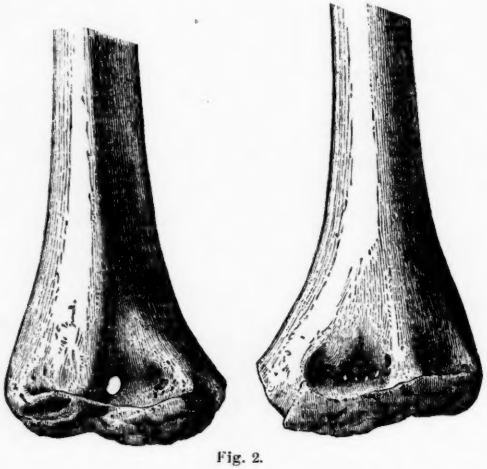


Fig. 2.

Figure 2 is also by Dr. McC. and of natural size. It represents the humeri of a child about eleven years old, from the same collection. The right humerus shows a small foramen, with sloping edges. The left shows a wider, flatter, and thinner partition, with several small openings. It looks to me as if these foramina were just in process of formation, with the promise of the left being the larger. I was at first inclined to think with De Blainville and Meckel that the foramen was due to a want of ossification; but if I interpret these specimens correctly it is formed at least sometimes and probably always, not by a failure to ossify, but by a process of atrophy after ossification has taken place. It will be observed that the fossæ and foramina are above the line of epiphyseal junction.

The fact that in the collection of tapirs above mentioned the young did not show the foramen while the mature animals did seems to favor my proposition that atrophy occurs as maturity approaches. If this be correct, then the atrophy itself would seem to be caused by the pressure of the coronoid or olecranon process, presumably the latter, as shown, for instance, in the dog, where in the dry bone the olecranon process projects even through the foramen.

Dr. Harrison Allen, of Philadelphia, wrote a commentary on this paper as it was originally prepared and before some important observations had been made. I insert here so much of his remarks as will apply to it in its present shape. He says:

"Reviewing the list in which the olecranon perforation is absent, it is seen that it includes all swimming and flying forms, as instanced in Sirenia, Cheiroptera, and Pinnepedia. In terrestrial types, which are adapted to life in the water, such as the aquatic carnivora, it is also absent. Such facts suggest the conclusion that the relief of the limb from impact is in some way associated with the absence of the foramen. In like manner the absence of the foramen in the Edentata is evidence in the same direction, since these creatures are either fossorial or arboreal, and in neither adaptation is any result of impact demonstrable in the limb. If, therefore, it be conceded that the foramen is absent as the result of withholding of co-ordinated lines of pressure which accompany progression upon the ground, it becomes interesting to contrast the humeri of the old and the new world monkeys. In those of the old-world group the foramen is present, since progression (except in *Hylobates*) is much the same as in other terrestrial mammals; whereas in those of the new world the prehensile tail must remove much of the impact from the limb.

"Again, even among the terrestrial carnivora the impact is much less (owing to the spread of the toes in the act of supporting the body) in Felidæ, Procyonidæ, and Ursidæ than in Canidæ. Why it is absent in some of the Ungulata and present in others is inexplicable by any such hypothesis. It appears to be variable in limbs of the same species as in the ourang and to be present in wild forms yet variable in domesticated forms of sus scrofa. In man the greater frequency of its presence on one side of the body is curious, for according to the law of impact it should be absent on both.

"In conclusion, I may say that the theory of impact appears to account for the presence of the foramen in some of the most highly differentiated forms, but that its significance is evidently complex and will not admit of a single explanation.

"In domesticated animals, including man, I am convinced that variations are always of obscure significance. The effects of diseased action often disturb the evolution of characters, and the observer must be on his guard how far to rely on general biological tenets in his attempts to explain variable structures."

Dr. J. L. Wortman, anatomist of the Army Medical Museum, has written the following opinion:

"The explanation of the presence or absence of the olecranon perforation in the mammalian humerus is not altogether an easy matter when we take into consideration the diverse and widely separated forms in which it occurs; still there can be little doubt that in some species at least, in which it is very constantly present, the simple mechanical explanation appears to be the only reasonable one that can be offered.

"An example of this kind is afforded by the dog and hyena, among the terrestrial carnivora. In them it will be noticed that the perforation or foramen is always large, and that the olecranon fossa is remarkable for its depth; that in extreme extension of the forearm the olecranon process of the ulna fits accurately into the foramen, thereby allowing the limb to assume nearly a straight line, which it could not otherwise do if no foramen were present. In the cat, on the other hand, in which the foramen is invariably absent, so far as my knowledge goes, the limb cannot be brought so nearly into a straight line by extreme extension of the forearm, for the reason that the olecranon process of the ulna impinges upon the bony septum between the coronoid and olecranon fossæ of the humerus.

"How, now, will we explain the difference in structure upon any hypothesis regarding the use of the limb? It is a fact to be constantly observed in the habits of these animals that the dog and hyena, in feeding, place both forelimbs upon the bone or other morsel and remove pieces by tearing or pulling them off with the mouth. Again, who has not noticed the delight of the puppy at play in taking hold of an object with his mouth and pulling? Both of these acts require that the forelimbs, in order to form an efficient brace, must be made to assume as nearly a straight line as possible, so that the strain may fall directly upon the bones and not depend upon the strength of the triceps muscle, which would prove a manifest disadvantage. A constant repetition of this posture and a constant effort upon the part of the animal to straighten out its forelimbs has caused an encroachment of the olecranon process upon the bony septum between the olecranon and coronoid fossæ, resulting, finally, in its disappearance and the formation of the foramen.

"In no other species of the carnivora, with the possible exception

of the civets, do we observe similar habits or a similar use made of the forelimb; and in none of the rest of them do we find the foramen present. It may therefore be reasonably concluded, I believe, that in so far at least as these animals are concerned the mechanical hypothesis affords an explanation.

"As regards the presence of the perforation in other forms, Dr. Allen has already suggested a plausible reason for its absence in the Cebidæ and its frequent occurrence in the Simiidæ among the primates. Among the Rodentia it appears to be principally developed in the Lagomorphs or rabbits and the Hystricomorphs or porcupines and their allies, although some few of both the squirrel and rat divisions show it. I am not familiar with the habits of these animals; but it is possible that some peculiar movement of the forelimb in obtaining their food may be responsible for its production in a manner not dissimilar to that already discussed in regard to the dog and hyena.

"Concerning the Ungulates, its presence in such forms as the prong-horned antelope, the pig, peccary, tapir, and, possibly, a few others, would appear at first sight to be puzzling; but when we recall the habits of some of these species we are not so much at a loss for an explanation.

"The pig and peccary have a habit, similar to that of the dog, of using their forelimbs to hold their food firmly to the ground, if it is of so firm a nature as to require forcible tearing apart. The same conditions would prevail, therefore, as in the dog, and as a result the foramen appears. This explanation will not apply to the prong-horned antelope in so far as the particular use of the limb is concerned. In them I fancy the perforation appears by reason of their peculiarly stiff-legged way of running, if I may so call it. This is so marked that the practised eye of the hunter seldom fails to distinguish the peculiar gait of the animals even at a great distance, as I have so frequently observed. The effect is again the same in this case, namely, straightening the limb and the consequent pushing through of the olecranon process of the ulna.

"In the case of the tapir I am not sufficiently acquainted with the habits of the animal in its native haunts to offer any explanation, but it would not be at all surprising if it is found that he uses his forelimb after the manner of the pig in tearing up succulent roots and other materials upon which he feeds."

I have no further explanation of my own to offer and would

rather submit the case in its present shape. The historical research seems to confirm the testimony of the osteological collections, that the foramen was most frequent among the ancient peoples. The relative habits will probably explain the difference.

The greater frequency on the left side is still an enigma. I have noticed that generally where it was present on both sides the left was usually the larger; where absent on both sides the left partition was usually thinner.

I desire to thank Dr. J. L. Wortman, anatomist of the Army Medical Museum, and Mr. Fred. Lucas, of the U. S. National Museum, for assistance in preparing this paper.

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The above paper was read before the Society February 15, 1890. In the discussion which followed, Dr. MATTHEWS said that as the olecranon perforation was, in all probability, due to repeated and

forcible extension of the forearm, we must look for its cause in some labor which required its extension. Among the agricultural aborigines of the Southwest, who showed high percentages of this formation, we need not go far to discover the existence of such labor. The females were engaged during the greater part of their time in grinding corn; this was performed on a *metate*, or large flat stone, by means of a smaller stone, which was held in both hands of the operator and moved forward and backward. The chief exertion was made in moving the stone forward and required the most forcible extension of the forearm. Some agricultural tribes of the North used wooden mortars and pestles, which required a different motion in working them.

Professor COPE remarked that the orifice in the humerus discussed by Dr. Lamb could be called neither a foramen nor a fontanelle, but is simply a perforation dependent on the thickness of the lamina which separates the anterior and posterior fosssae of the humerus. It is not useful for systematic purposes, as its presence rarely coincides with the rest of the structure. It indicates a deficiency of bone structure at the locality in question, but he was unable to assign any definite cause for this condition. The presence of the perforation is certainly not due in some cases to continued extension of the fore-arms; since in many aquatic mammals, as the seals, where vigorous extension is necessary to the use of the limb in swimming, the foramen does not occur. Within a limited range the character might be useful for diagnostic purposes, as for instance, as an aid in discrimating certain races of mankind.

POLYNESIAN LANGUAGE.—René Allair (in Revue Géographique Internationale for December, 1889, p. 266) characterizes the language of Polynesia as follows:

"The language is soft; it is as clear and well defined as French, simple as English, but less unpleasant in pronunciation; poetical as German, but less complicated; rich as Russian, but less difficult. It abounds in vowels like Japanese and Italian; it is as noble as Spanish."

JOHN MURDOCH.

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OF

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BOOK NOTICES.

British Association for the advancement of Science. Fifth Report of the Committee appointed for the purpose of investigating and publishing Reports on the Physical Characters, Languages and Industrial and Social Condition of the North-Western tribes of the Dominion of Canada. London, 1889.

As stated by Mr. Hale in his preface to the above report, British Columbia offers to the present student of anthropology the best field for original research in North America. To a considerable extent this is due to the fact that the tribes, especially of the interior, have suffered comparatively little from contact with civilization and yet retain in pristine simplicity many of their old customs and beliefs.

The effort, therefore made by the Canadian Government, conjointly with the British Association for the Advancement of Science, to harvest the material from this comparatively unworked field must interest all students of anthropology.

That the selection of Dr. Boas for this important work, because of his experience and training, was a wise one, is fully substantiated by this, his first general report.

Though the trip undertaken in 1886–87 and that of the following year were in the nature of reconnaissances, a considerable body of important facts was gleaned, an earnest of the full harvest which awaits more extended observation.

In this connection it may not be amiss to call attention to the fact that the demands of the science of to-day can only be met by the student who is able not only to visit but to live among the people he would investigate, and the more closely he conforms to the habits and life of the tribe and the more completely he is adopted by them, the fuller and more accurate will be his returns. No one better understands the situation that Dr. Boas, and in his comments upon the necessarily fragmentary character of his results he states that " the difficulty of observing or even acquiring information on such points [social organization, customs, arts, and knowledge] during a flying visit of a fortnight—the maximum time

spent among any single tribe—is so overwhelming that no thorough report is possible, and it is almost impossible to guard against serious errors."

Unfortunately the students as yet are few who, like Dr. Boas, are willing to decivilize themselves, and to be Indians among the Indians. Yet it is certain that until the men and means are found to do the work in this way, the results reached will continue to be fragmentary and more or less permeated with error. The stranger, however well acquainted with Indian nature and however tactful, must remain a stranger in a tribe for a long time, for Indian suspicion and reserve are hard to penetrate. The missionary who knows an Indian language, and no missionary can succeed who does not, has so far an advantage, but as his teachings are largely directed against Indian customs and beliefs, and his position is thus antagonistic, he too can, as a rule, reach but a limited distance into the mysteries of Indian sociology, mythology, etc. It is only the trained student who is willing to sever himself from civilization who can reap a full measure of success.

Space permits mention of only a few of the important details of Dr. Boas' paper. The country visited is occupied by tribes belonging to no fewer than seven or eight distinct linguistic stocks—a statement which at once conveys an idea of the difficulties of the student.

These, as given by the author, are:

1. Tlingit of Southern Alaska; 2. Haida of Queen Charlotte Islands and part of Prince of Wales Archipelago; 3. Tsimshian of Nass and Skeena Rivers; 4. Kwakiutl of the coast from Gardiner Channel to Cape Mudge, except the country around Dean Inlet and the west coast of Vancouver Island; 5. Nootka of west coast of Vancouver Island; 6. Salish of the coast and the eastern part of Vancouver Island south of Cape Mudge, the southern part of the interior as far as the coast of the Selkirk Range, and the northern parts of Washington, Idaho, and Montana; 7. Kutonāqa of the valley of upper Columbia, Kootenay Lake and River, and adjacent United States.

Dr. Boas points out that the language of two of these families, the Haida and Thlinkit, contain many similarities of form and phonetic elements, and that at least they form one group both by reason of their similarity to each other and their dissimilarity from the other families. He, nevertheless, notes a great difference be-

tween their respective vocabularies and grammatic elements and hence treats them as distinct, though considering the question of this relationship yet an open one.

The Indians of the coast without regard to family are naturally fishermen as are also, chiefly, the interior Salish and Cootenai. Most of the interior Indians have given up their ancient customs and are Roman Catholics. They are said to be good stock raisers and to endeavor to irrigate their lands, but to be poor. The Coast Indians are well off.

The Tsimshian have been Christianized, as is well known, and have given up nearly all their own customs.

The physical character of the coast tribes is said to be very uniform. This would seem to have resulted from similarity of habits and general environment rather than from the "frequent intermarriages" as stated by the author, though this too, doubtless, contributes to the general result. He finds further that the habitus of the northern tribes—Tlingit, Haida, Tsimshian, Kwakiutl, and Bilqula, and to a less extent of the Nootka—is similar to the East Asiatic tribes. The coast and interior Salish are of a different type. "As the Bilqula speak a language belonging to the Salish family, it must be assumed that they acquired this distinct physical character through intermixture with the neighboring tribes."

Labretifery prevails among the females of the Tlingit, Haida, Tsimshian, and Heiltsuk, in short among the northern tribes of the region, from whom, probably, the custom was borrowed by the Alaska Eskimo.

Chiefs' daughters among the Tsmishian are said to grind down the incisors to the gums by chewing a jade pebble, thus forming an arch—a curious sign of royalty indeed!

Dr. Boas is of the opinion that the mental capacity of the Indians described is high. He thus sums up their chief traits:

"He is rash in his anger, but does not easily lose control over his actions. He sits down or lies down sullenly for days without partaking of food, and when he rises his first thought is, not how to take revenge, but to show that he is superior to his adversary. A great pride and vanity, combined with the most susceptible jealousy, characterize all actions of the Indian. He watches that he may receive his proper share of honor at festivals; he cannot endure to be ridiculed for even the slightest mistake; he carefully guards all his actions, and looks for due honor to be paid to him by friends,

strangers, and subordinates. This peculiarity appears most clearly in great festivals, which are themselves an outcome of the vanity of the natives, and of their love of displaying their power and wealth. To be strong, and able to sustain the pangs of hunger, is evidently considered worthy of praise by the Indian; but foremost of all is wealth.

"It is considered the duty of every man to have pity upon the poor and hungry. Women are honoured for their chastity and for being true to their husbands; children, for taking care of their parents; men, for skill and daring in hunting, and for bravery in war."

A very important subject for investigation among our Indian tribes is the nature of property ownership, especially of land. It is generally believed that tribal ownership in land was the universal rule among eastern tribes. Not so among the coast tribes of British Columbia. Mr. Dawson states of the Haida (Queen Charlotte Islands, 1880, 117, 118) that the coast line and berry fields belong to the different individual families by whom they are considered as personal property and as hereditary.

Dr. Boas, however, assigns to the gentes the property rights which Dawson gives to individual families. The former says, p. 37:

"Among all the tribes heretofore described, each gens owns a certain district and certain fishing privileges. Among the Tlingit, Haida, and Tsimshian, each gens in each village has its own fishing-ground; its mountains and valleys, on which it has the sole right of hunting and picking berries; its rivers in which to fish salmon, and its house-sites. For this reason the houses of one gens are always grouped together. * * * The right of a gens to the place where it originated cannot be destroyed. It may acquire by war or by other events territory originally belonging to foreign tribes, and leave its home to be taken up by others; the right of fishing, hunting, and gathering berries in their old home is rigidly maintained. A careful study shows that nowhere the tribe as a body politic owns a district, but that each gens has its proper hunting and fishing-grounds, upon which neither members of other tribes nor of other gentes must intrude except by special permission."

But more curiously still "the property of the whole gens is vested in the chief, who considers the salmon rivers, berry patches, and coast strips in which the gens has the sole right, as his property." The chief thus appears to be a sort of executive officer and administrator to the gens.

Many important facts are given respecting the food, occupations, clothing, implements, houses, social organizations, government and law, birth, marriage and death customs, religion, shamanism, secret societies, and finally languages of the natives of this part of America. It is to be hoped that the investigations thus auspiciously begun may be continued indefinitely to the honor of the Canadian Government and the profit of scholars everywhere.

H. W. HENSHAW.

Les Premières Populations de L'Europe, par le M^is^ de Nadaillac. Paris, 1889.

This work is in continuation of that by the same author, *L'Origine et le développement de la vie sur le globe*, published in 1885, which was intended to describe the succession of beings that have filled earth and sea "before the appearance of man at the moment prescribed by the divine will." The author now treats of man, his races, peoples, and advances, but in the present volume confines himself to the man of Europe, presenting, however, illustrations and parallels from all other parts of the world.

The treatise is in many respects excellent. In particular the brief but comprehensive account of the megalithic monuments may be mentioned, and perhaps no better summary of existing knowledge relating to the palafittes has been presented. The theory of the population of the earth by migrations from the arctic circle is disposed of with convincing force. The discussion concerning the priscan home of the Aryans is both fair and acute, the author's deductions being in favor of Bactria as a locus of dispersion. On the whole, the valuable portions of the work are too many for special notice in the space now allowed, which must be reserved for mention of some points requiring examination on account of their exposure to adverse criticism.

Undue weight is given in this treatise, as in most others on the general subject, to the objects found in connection with buried human remains as affording evidence of a synchronous prevalent belief in a future life. Undoubtedly, most tribes of men have held such a belief, more or less vague, at a certain stage of their culture; and then objects were buried with the dead which, in some undefined way, were supposed to be useful in the future state. But there was once a widespread custom of disposing of certain kinds of personal

property with the corpse, sometimes by burial, but also by cremation, in which the motive was sociologic and not religious. The object was to destroy the articles so as to preserve peace among the survivors. In a certain stage of savagery a man could have no property whatever, all property belonging to his clan. The first modification of this condition was in the allowance of personal ownership in weapons, tools, or ornaments of a man's own manufacture. On his death these objects did not belong to any one by title and, if not removed, they would become the occasion of contention, so they were destroyed, the act producing in time a burial rite. It is also to be considered that even at the present day the most cultured people bury with the corpses of their relations and friends such objects as were especially associated with the deceased in life. This is through a personal sentiment, and is certainly not a religious sentiment, though it may be connected with religion through heredity. An officer of the army is sometimes now buried in his uniform and with his sword, and his wife is buried in her last ball costume and jewels, but these practices do not imply the supposed use of those adjuncts in a future life, though they possibly are rooted in superstition changed in its expression. As we clearly know other motives than those connected with any religious dogmas for the burial, together with human remains, of such objects as are brought in evidence by the Marquis de Nadaillac and others of his school, the religious inferences derived from such burials are by no means conclusive. They may be suggestive and, in connection with other facts, may be highly instructive, but by themselves, as they are and must be in the older instances, they do not prove what is claimed for them.

The most serious error of the author is in the doctrines promulgated about the several distinct qualities and missions of what he assumes to be the distinct races of men. His commencing and concluding pages clearly set forth certain opinions as of ruling import, and fatalism is his watchword. He does not believe that there have been planes of culture common to all men from the earliest periods known, the characteristics of which planes were modified chiefly by specific environment. He regards the several races which he catalogues as specifically adapted by idiosyncrasy or predestination to certain planes and as limited to stages of advance beyond which, to them, death bars further progress, not even absorption being allowed.

There can be no doubt that death bars advance if the people who might, could, or should have advanced are exterminated by foreign invasion, and doubtless absorption is prevented when, *e. g.*, the Jews and the Goim, neither people will marry with the other; but such cases are exceptional in the grand history of man. The examples cited by the author are not fortunate. The most conclusive to him is the alleged fact that the North American Indian never has been and never can be civilized. That is the old *ferœ naturæ* doctrine, now utterly disproved. It would seem that the Marquis had not read much of the literature of the last twenty years on this topic.

The last half of the author's last page, which gives his fundamental summations, presents some inconsistencies occasioned by the importation of what may be called the Calvinistic doctrine of predestination and election into the domain of anthropology. He says: "History shows on every page great peoples—the Egyptians, the Chinese, the Mexicans, the Peruvians—stopping in their start as if an impassable barrier had been planted before them. Arriving at the limit fixed by impenetrable decrees, they are not only incapable of progress but even of comprehending the power and necessity of progress." History might have something to explain about these peoples quite distinct from racial characteristics. This assertion is followed by the statement that "progress comes from the infusion of foreign blood among the old autochthonous populations," and that "the races of Europe, which were and are reserved for the highest destinies, owe their grandeur and incessant progress to the Asiatic invasions." Thus racial characteristics and racial predestination are of much higher import than environments, yet progress was gained by the amalgamation of races, not by their continued purity. All races that became amalgamated in Europe were good as ingredients; all others were bad. It is to be inferred that the "autochthonous races" of Europe and of Asia were both bad, but that a primordial decree allowed of their favorable amalgamation with excellent results. So it would seem that if some other races had been allowed to amalgamate the result might also have been good. But the decree was against this union. There is no consideration of the fact that causes are known to be in continuous operation by which, the world not yet being at its end, there may be further amalgamation of peoples that are still in different stages of advance. It would be difficult to propose any explanation of man's progress less

scientific or more egotistic than this theorized monopoly of preordination. It recalls the Puritan pronunciamento: *Resolved*, 1st, that the earth belongs to the saints; *Resolved*, 2d, that we are the saints.

GARRICK MALLERY.

Myths and Folk-lore of Ireland. By Jeremiah Curtin. Boston. Little, Brown & Co. 1890. Cloth, 12 mo, vi, 345.

Such is the title of an attractive volume which comes to us in an appropriate binding of green and gold, with a spray of shamrocks in the corner. The author (an American by birth, but Irish by remote ancestry, as the name indicates) is probably as well qualified for the task he has undertaken as any man living, being a professional linguist and mythologist who has spent many years investigating the languages, customs, and traditions of the primitive people of three continents, from the root-eating tribes of California to the warlike mountaineers of the Caucasus. The twenty myths here given are part of the material collected in the district of the west of Ireland where Gaelic is still the everyday language of the people. Most of the stories were gathered through interpreters from the lips of old men and women to whom English is a foreign tongue, and most of whom have never been farther from home than the nearest market town or the bounds of the next parish. The result is a collection of Keltic heroic legends almost entirely free from the foreign corruptions due to the intrusive race.

In the introduction, the author treats of the nature and origin of myths. He dismisses as partial, and therefore incorrect, the theories of Müller and Spencer, who derive all mythology from a misconception of the meanings of words and a confusion of ideas, and asserts, what is probably the true theory, that it has its origin rather in a misconception of the causes of phenomena, or, as Mr. Curtin puts it: "The personages of any given body of myths are such manifestations of force in the world around them, or the result of such manifestation, as the ancient myth-makers observed."

The definiteness of detail characteristic of Irish stories contrasts strongly with what is found in other parts of Europe. In Hungary, for instance, the usual introduction is, "There was in the world," while the Russian story teller, hardly more satisfactory, informs us that "in a certain state in a certain kingdom, there was a man."

"In the Irish myths," on the contrary, "we are told who the characters are, what their condition of life is, and where they lived and acted; the heroes and their fields of action are brought before us with as much definiteness as if they were persons of to-day or yesterday," and in another place he asserts that "the Gaelic mythology, so far as it is preserved in Ireland, is better preserved than the mythology of any other European country." From the definite character of the myths, together with the internal evidence afforded by the language itself, it would seem that the Gaelic occupancy of Ireland dates from a very remote antiquity, going back, in fact, to the period of the earliest wave of migration from the primitive home of the Aryans.

The most interesting legends of the volume are those belonging to the great epic cycle of the Féinne—the Nibelungenlied or Kalevala of the Gael. The Féinne were the knightly champions of ancient Ireland, banded together under the leadership of Fionn MacCumhail, from whom they derived their name. The story of their origin is curious. The beautiful daughter of a king is to be won only by the performance of a feat which all the princes and heroes of Ireland had attempted in vain, and in consequence of failure they have been confined in a dungeon and condemned to a cruel death. Fionn, a youth until now unknown to the world, performs the task and rescues the heroes, who agree to follow him and obey his every command. Thus originated the *Féinne Éirinn*. Fionn himself is the offspring of a secret union between Cumhal and a king's daughter, and has been brought up in concealment by his grandmother to escape the wrath of the king, to whom it had been foretold by the druids that he would one day lose his kingdom at the hand of his grandson. In all his adventures he is accompanied by a group of chosen companions, each one of whom is endowed with some magic gift, and by a wonderful dog, Bran, born on the same day as her master. The champion himself obtains knowledge of whatever is going on in any part of the world by chewing his thumb, which had once touched the Salmon of Knowledge. One of these legends, that of the death of Cuchullin, resembles the pathetic story of Sohrab and Rustem in the Shahnameh. The cycle properly ends about the beginning of the Christian era, but is brought down to a later date by the re-appearance of Oisín (the Ossian of Macpherson), who returns from the Land of Youth, after an enchanted existence of three hundred years, in time to be baptized by Saint Patrick, soon

after which he dies. The legends are common to the Gaelic population of both Ireland and Scotland, and in the former country, especially, some one of the leading incidents is localized in almost every county. The modern Fenians derive their name from these old mythic champions.

Not alone the Fenian stories, but also all of the others which can be considered distinctively Gaelic, are found in almost identically the same form in the highlands of Scotland, as was discovered by Campbell, who published a valuable collection of "Popular Tales of the West Highlands" nearly thirty years ago. For instance, in the Irish story of "The King of Erin and the Queen of the Lonesome Island," the false queen is made to put on a magic belt, which tightens and compels her to confess that her children are not the king's sons. In the version noted by Campbell "Conall, at the end, puts a ring on the queen's finger. It tightens and forces her to confess that her sons are not the king's children, and Conall reigns as the king's only son." The Green Isle of Campbell may be the Lonesome Island of our author, from a confusion of two similar words, *uaine* (green) and *uaigneach* (lonesome). The incident of the hero and the sleeping queen occurs also in a Norse tale in Dasents' collection. "Fair, Brown and Trembling" is another form of the story better known as "Cinderella." The version here given, although obtained in the Gaelic district of the west, has evidently suffered at the hands of the modern story teller, who makes the king's son go to mass and wait outside the church door for the maiden, who is afterward shut up in a closet by her envious sisters to conceal her from his sight. In the Leinster version, as learned by the writer years ago at his mother's knee, the girl goes to a grand ball at the king's palace and is afterward hidden under a large basket (*cliabh*), when the little bird hops in at the door and begins to sing,

> "Bonny foot and hily foot,
> In under the basket."

The author is to be commended for studiously avoiding that abominable mixture of jargon and cheap vulgarisms popularly supposed to represent the Irish brogue, while at the same time he has carefully preserved the strong Gaelic idioms which give so much force and beauty to the language, as exemplified in the proverb of the people, "Plead for your life in Irish." It must be remembered that English is a foreign tongue which has been forced upon the

people of Ireland, chiefly within the present century, and the broken forms of the Irish peasant no more represent his correct modes of expression in his own language than the coarse slang and dialect phrases of the Georgia cracker or the western cowboy represent the language of Americans. The only effect of such a misuse of words must be to disgust sensible people and represent an intelligent nation as a set of buffoons.

It is to be regretted that more space is not given to explanatory notes and to comparisons with the mythology of other European countries, but this may be remedied in a future edition. Taken altogether the book is the best of the kind that has appeared since Kennedy's collection was published twenty-five years ago, and is the first real attempt to bring to popular notice the splendid legendary treasures of the oldest nation of Western Europe.

JAMES MOONEY.

Report of the Cruise of the Revenue Marine Steamer Corwin in the Arctic Ocean in the year 1884. By Capt. M. A. Healy, U. S. R. M., Commander. Washington, 1889.

The recently issued report by Capt. M. A. Healy upon the cruise of the Corwin in the Arctic, in 1884, possesses more than usual claims upon the attention of those who are interested in the natives of Northwestern Alaska. It is nearly three years since the companion report of 1885 was issued, and the two together supply many valuable details regarding the little known natives of the interior of Northwest Alaska. The report for 1884, though issued subsequently to that of 1885, is much more satisfactory to the student of anthropology.

The report of the commanding officer contains, in addition to the matter descriptive of the country and the cruise, some interesting statements in regard to the Eskimo. The injustice of the law which prohibits the sale of breech-loading rifles to the Eskimo is pointed out, and its repeal advocated on the ground of reason and humanity.

The efforts of the Corwin have resulted, it is said, in the almost complete suppression of the whiskey traffic with many of its attendant evils; but it is evident, from other statements in the book, that the good work is by no means finished.

As a result of fifteen years' observation, Captain Healy places the native population of Alaska at about 20,000. It is, however, to the narrative of the exploration of the Kowak River by Lieut. J. C. Cantwell that the student will turn with greatest interest. Though the primary purpose of the journey was exploration and not scientific investigation, and although no professed ethnologist accompanied the party, yet many important facts regarding the natives were obtained and recorded.

The interior of Northwest Alaska is composed of broken, irregular mountain ranges with wide stretches of tundra or sphagnum plains. Small streams of water intersect the tundra in every direction which have their origin in innumerable lakes. In such a country a boat is an absolute necessity for summer travel.

The inhabitants of the river are Eskimo, but they are Eskimo of the interior, and the change of habitat has resulted in a corresponding change of habits and apparently even of physical characteristics. Thus we are told that they have, as a rule, dark complexions, prominent cheek-bones, large mouths, and sharp chins, giving to the face a triangular appearance very different from the round face of the coast Eskimo.

An estimate of the population of the Eskimo of the Nöitoc, Kowak, and Selawick rivers, whose language and customs are said to be practically identical, is as follows: Nöitoc, 350; Kowak, 275; Selawick, 300—total, 925.

From the middle of July to the latter part of August, the natives from the inland meet their brethren from Cape Prince of Wales, Diomedes, and Point Hope, on Hotham Inlet, for the purpose of trade, and their intercourse appears to be limited to this period.

Unlike the coast Eskimo, the Kowak natives do not live in permanent winter settlements. In early winter they gather in small, isolated communities, usually of from one to three families, and live in subterranean houses near the banks of the larger streams. Later, when deep snow has fallen and the surface is frozen hard enough for sledding, they begin a nomadic life. At this season the flesh of the reindeer furnishes the chief means of subsistence, and in the pursuit of these animals they are compelled to wander here and there over the vast plains of the interior. Having located a herd of reindeer, the young men are followed by the old men and the women and children, whose duty it is to bring up the camp equipage on dog-sleds. Notwithstanding the precarious character

of the food supply at this season, the natives are said to be as improvident as the North American Indian usually is wherever found, and they rarely have on hand more than two or three days' extra supply of provisions. As it not infrequently happens that stormy or very cold weather imprisons the hunters within doors for a week at a time, starvation is often threatened and occasionally whole families fall victims. It seems to be their usual custom to dry sufficient fish to last from the time the rivers are frozen until winter hunting begins; but with this exception the natives appear to make no effort to lay up a store of provisions in case of accident or unusual scarcity of game.

The cooking in winter is of the most primitive kind: A small wooden tub is filled with snow which melts in the heated air of the iglu; the water then made to boil by means of stones heated to redness in the flame of the stone lamp. The meat is then partially boiled.

When the ice in the river begins to break up and the returning sun has rendered the snow unfit for sledding, the natives gather in small settlements along the banks of the larger rivers and locate their summer houses. The men then have recourse to hunting and trapping, and the women prepare their nets for fishing, for, rather curiously, the labor of catching the fish is allotted to the women. The summer houses are very simple structures, being made by planting half a dozen pliant willow wands in the ground in the form of a circle, bending their upper ends and twisting them together to form the frame. A covering of deer skins or drilling makes the house complete.

Lieutenant Cantwell supplies the natives with a certificate of excellent character. They are honest in dealing with strangers and among themselves. They are simple, credulous, and hospitable, and though intensely curious, are not prying or intrusive. In their domestic relations they are kind to each other, and the universal consideration paid to the old is a marked trait of their character. He admits, however, that they are prone to the sin of lying, and when detected, they do not exhibit any shame whatever.

As appears to be the case among the Eskimo everywhere, there are no recognized chiefs or any trace of tribal union. The shamans are greatly respected among them, and those individuals more intelligent or more highly gifted naturally have much influence. As the women render important assistance in obtaining food

and as burden carriers, they, too, have considerable influence, and it is stated that "in all discussions touching the welfare of the community, or any important project, the women, especially the old ones, join, and their opinions are received with evident respect by the men."

They suffer most from pulmonary complaints and rheumatism. Epidemic diseases are of rare occurrence, and it is stated that syphilis has not reached the interior settlements to any great extent, but it is only a question of time when its ravages will extend from the coast tribes to this people. The treatment of the sick consists, as among our Indians, of shamanistic rites, the shaman using a few herbs to assist him in his incantations, nothing in the way of medicine for the disease being given to the patient.

Near the coast the ordinary Eskimo kyak is used, but towards the upper Kowak boats of spruce and birch bark were found, the former material being employed for the larger and more serviceable boats, while birch served for the lighter canoes that are stated to have been of the most exquisite design.

In the winter snow-shoes furnish the ordinary means of locomotion, while transportation is effected by means of dog-sleds.

Unlike the coast Eskimo of Alaska, the Kowak Eskimo do not, as a rule, wear labrets. Altogether these inland Eskimo form an interesting object for study, combining as they do, to a slight extent, the habits of the coast Eskimo with the general habits and, apparently, also, to some extent, the physical characteristics of the Athapascan or Tinne tribes of the far interior. They serve well to illustrate how completely the Eskimo is a creature of his environment, and the extent and readiness with which changes take place when he is subjected to different conditions of life.

It is greatly to be regretted that the author of this valuable report did not obtain vocabularies of the people he visited. The comparison of the dialects of these inland Eskimo with one another and with those of their coast brethren could scarcely fail to yield interesting and important results. The report is generously illustrated, and among the illustrations of the natives and their houses and products are some of the best that have yet appeared.

H. W. Henshaw.

NOTES AND NEWS.

PREHISTORIC MAN IN AMERICA.

To the Editor of the American Anthropologist:

DEAR SIR: I agree so entirely with the sensible and conservative conclusions of Major Powell's article upon *Prehistoric Man in America*, in the Forum for this month, that I regret that any flaw may be detected in his arguments by "archæologists." As an anthropologist and geologist his reasoning will undoubtedly carry great weight, but I believe he makes no claim to be regarded as an archæologist; while he certainly has sufficiently indicated his opinion about "pseudo-archæologists." As my own published opinions coincide in almost every particular with his, I cannot be suspected of any other motive than to strengthen the case he undertakes to establish.

That the so-called "mound builders" were ancestors of the Indians I fully believe, but it is not the fact that "white traders" ever offered to the Indians "stone tomahawks and stone knives," as he states, or "a better class of copper tools," and that in consequence such objects have been "scattered through early barter far and wide over the land." Such a proceeding clearly would have been futile. The first traders wished to make the Indians more successful hunters in order that they might get more peltry from them, and to effect this provided them with steel tomahawks and steel knives in place of their own weapons made of stone or occasionally of copper. This is perfectly well known both by historical evidence and by archæological proof. All the "beautiful" stone and copper implements that have ever been discovered are of native fabric, with the exception of certain gross and palpable forgeries by which no properly-informed "archæologist" could be deceived for a moment.

In regard to the stone mortars, discovered in large quantities in the gold-bearing gravels of California, Major Powell states that they "are identical in every respect with those found in modern times," and he suggests that they may have been used by the Indians to grind acorns in. But this is entirely at variance with the statement

of Mr. Skertchly in an article "On the Occurrence of Stone Mortars in the Ancient (Pliocene?) River Gravels of Butte County, California," published in the *Journal of the Anthropological Institute of Great Britain and Ireland*, Vol. XVII, pp. 332–337 (Jan. 10, 1888). He says "This country was inhabited by the Digger Indians until about the year 1865. My friend, Mr. Glass [the superintendent of the Spring Valley Gold Mine], was well acquainted with them, and assures me that they did not use such mortars. They hollowed out rocks *in situ* and therein pounded the acorns on which they so largely subsisted. They were acquainted with these mortars, but knew nothing about the makers of them, and held them in such superstitious dread that on no account could they be induced to touch one."

Again, Major Powell does not discriminate sharply enough between "palæolithic implements," properly so-called, and those of a similar rude type, which were manufactured and used by the Indians at or about the time of the advent of the Europeans to these shores. I suppose he has in mind the error into which Mr. Wilson has fallen in his article in the *Anthropologist*, for July, 1889 (vol. II, p. 239), on *The Paleolithic Period in the District of Columbia*, that "the distinct type of implement called paleolithic is not known to have been used by the American Indian." I have taken too many of them with my own hands out of Indian "shell heaps" not to know the contrary. There is no difference in "type" between them, and the sole distinction lies in the circumstances under which they have been found. I wish Major Powell had made this clear, as he certainly believes in it.

It is greatly to be regretted that Major Powell should seem to question the genuineness of the carvings and drawings upon bone, ivory, or reindeer horn, which have been discovered in the cave-dwellings of the Dordogne, in Southern France. I am sure he would not have done so if he had ever seen any of the originals, and he must have been misled by poor engravings of them. For this reason I regret the more that I have not been able to find a purchaser in this country for the fine collection of them, made by the Vicomte Lastec St. Jal, from the celebrated cavern of Bruniquel. It would then be plain to see that "these unskilled savages could cut pictures on bone, and possessed the knowledge and skill needed to represent relief in form and relations in space," just as, it might be observed, the recent Eskimo have done. The more careful publications,

however, of the collections of MM. Massenat and Piette have given even those who have not had the advantage of personal inspection the ability to judge accurately about the genuineness of these most important contributions to the history of the artistic development of mankind.

HENRY W. HAYNES.

BOSTON, *January* 4, 1890.

ARCHÆOLOGIC DISCOVERY IN IDAHO.—In a recent address before the Brooklyn Institute Prof. S. Frederick Wright announced an archæologic discovery in Idaho, a short notice of which appeared in the Scientific American of November 9, 1889, and more recently in Scribner's for February, 1890. The account states that an artesian well was being bored at Nampa, Idaho, by Mr. M. A. Kurtz. The drill was used until the lava deposits were passed, when a sand pump was introduced, and at the depth of 320 feet a small figurette was brought up which is described as apparently the figure of a female, one arm and leg being missing. The image was first supposed to be of fine pumice stone, but, upon examination by Professors Putnam and Haynes, it appears to be made of stiff clay, with a coating of oxide of iron, which gives it a mottled appearance. The latter gentlemen are said to be well satisfied of the genuineness of the image and of the fact that it is of considerable antiquity. With reference to the all important question of the antiquity of the find, Prof. S. F. Emmons, of the U. S. Geological Survey, is of the opinion that the beds from which the image is said to have come are probably older than any deposits from which human implements have hitherto been derived. The beds in question were laid down prior to the lava flows which overlay it, and the depth of the cañon which the Snake river has cut in its present course through the lava is the time measure relied upon by Prof. Emmons. It is to be observed, however, that no detailed geological study of the region in question has yet been made, and, as Prof. Emmons himself states, such a study is absolutely necessary ere any reliable estimate of the age of the sand deposits can be made.

H. W. HENSHAW.